

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

Published every Thursday Morning by David Williams Co., 14-16 Park Place, New York.

Vol. 78: No. 21. New York, Thursday, November 22, 1906.

\$5.00 a Year, including Postage.
Single Copies, 15 Cents.

Reading Matter Contents.....page 1408
Alphabetical Index to Advertisers " 185
Classified List of Advertisers " 177
Advertising and Subscription Rates " 184

WANTED!
100 to 150 H. P. Boiler
HIGH PRESSURE PREFERRED.
GOOD SECOND HAND.
Forster Pulley Works, Cuba, N. Y.

The American Mfg. Co.
Ropes and Twines
65 Wall Street, New York

Bristol's Patent Steel Belt Lacing
SAVES
Time, Belts, Money.
Greatest Strength
with Least Metal.
Send for Circular
and Free Samples.
THE BRISTOL CO., Waterbury, Conn.
New York: 114 Liberty St.
Chicago: 753 Monadnock Bldg.

SAMSON SPOT CORD

Also Linen and Italian Hemp
Sash Cord.

SAMSON CORDAGE WORKS, Boston, Mass.

TURNBUCKLES

Branch Office, 11 Broadway, New York.
Cleveland City Forge and Iron Co., - Cleveland, O.

TURNBUCKLES.

MERRILL BROS.,
405 to 471 Kent Ave.,
Brooklyn, E.D., N.Y.

FOUNDRY IRON.

Pilling & Crane
Girard Building, Phila.
Machenev Bldg., Pitts'g
Empire Bldg., New York

It is Hard to Tell
which does the most damage—fire
or storm. With an



ROOF

You needn't care. M. F. holds the
record for its ability to withstand
them both.

SEE

**AMERICAN
SHEET & TIN PLATE
COMPANY'S**

Adv., Page 15

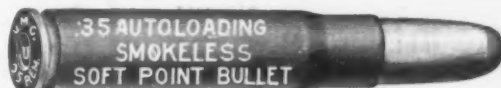
Remington



Autoloading Rifle

The new five-shot, repeating, hunting rifle which loads itself and is "big enough for the biggest game." Calibre .35 Remington, velocity 2000 feet, weight of bullet 200 grains. Solid breech, safe locking system, light trigger pull, and loads with clip. Every luxury with rapid fire, knock-down execution.

\$30 list, subject to
dealers' discount
CATALOGUE FREE.



REMINGTON ARMS COMPANY, Ilion, N. Y.

AGENCY
315 Broadway, New York City

SALES OFFICE
San Francisco, Cal.

WATER TUBE BOILERS **Stirling Consolidated Boiler Co.,**
111 Broadway, New York

There is no Horse Nail to Compare With "The Capewell"

It is the most Economical, the most
Durable and the most Popular horse
nail in the world. :: :: :: :: ::

Made by
The Capewell Horse Nail Company
Hartford, Conn



Jenkins Bros. Valves

are well designed and give full opening. They are thoroughly interchangeable so that any worn or broken part can be readily renewed. All genuine bear trade mark shown in the cut, and are guaranteed. Write for booklet.

JENKINS BROS., New York, Boston, Philadelphia, Chicago, London.

"Swedoh" Cold Rolled Steel is unexcelled for **Drawing and Stamping**
THE AMERICAN TUBE & STAMPING COMPANY SEE PAGE 15.
(Water and Rail Delivery) BRIDGEPORT, CONN.



MAGNOLIA METAL.

Best Anti-Friction Metal for all Machinery Bearings

Fac-Simile of Bar.
Beware of
Imitations

MAGNOLIA METAL CO.,

Owners and Sole Manufacturers,
Chicago, Fischer Bldg.

112 115 Bank Street,
NEW YORK

San Francisco, Montreal and Pittsburg.
We manufacture all grades of Babbitt
Metals at competitive prices.

ANOTHER THING SURE AND CERTAIN IS WHEN OUR NEW OPEN HEARTH STEEL MILLS

Commence to operate directly, we will be able to specialize more accurately than ever in making high grades and finishes of Tin Plates and Sheet Steels. As it is, **RIGHT NOW**, our customers tell us we are ahead of the times in Qualities. We have been very successful always in making "better" goods, and not just a "little" better either.

FOLLANSBEE
Brothers
Company
Pittsburgh

SHOE NAILS **BRASS**

4 PLAIN STRAIGHT FACTS

- 1st. The best produced, A strong statement, but the goods prove it.
- 2d. Brass cast and rolled on the premises. Care is taken in the stock, which is clean, ductile and the right temper.
- 3d. Inspection rigid; packages contain perfect nails only. No splinters nor imperfect heads.
- 4th. Packed in 2 oz. and 4 oz. metal boxes. 2 oz., 4 oz., 16 lb. and 1 lb. papers. One dozen packages in a carton. All goods full weight. Get our prices.

RIVER COMPANY,
Waterbury, Conn.

Bridgeport Deoxidized Bronze & Metal Co.

BRIDGEPORT, CONN.

Phosphor and Deoxidized Bronze

Composition, Yellow Brass and Aluminum Castings, large and small

THE PLUME & ATWOOD MFG. CO.

MANUFACTURERS OF

Sheet and Roll Brass —AND— WIRE

PRINTERS' BRASS, JEWELERS' METAL, GERMAN SILVER AND GILDING METAL, COPPER RIVETS AND BURS.

Pins, Brass Butt Hinges, Jack Chains, Kerosene Burners, Lamps, Lamp Trimmings, &c.

29 MURRAY ST., NEW YORK.
199 LAKE ST., CHICAGO.

ROLLING MILL:
THOMASTON, CONN.

FACTORIES:
WATERBURY, CONN.

SCOVILL MFG. CO.

MANUFACTURERS OF

**BRASS,
GERMAN SILVER,
Sheets, Rolls, Wire Rods,
Bolts and Tubes,
Brass Shells, Cups, Hinges,
Buttons, Lamp Goods.
Special Brass Goods to Order.**

FACTORIES:
WATERBURY, CONN.
DEPOTS:
NEW YORK. CHICAGO. BOSTON.

Henry Souther Engineering Co.

HARTFORD, CONN.

Consulting Chemists, Metallurgists
and Analysts.

Complete Physical Testing Laboratory.
Expert Testimony in Court and Patent Cases.

Arthur T. Rutter & Co.

256 Broadway
NEW YORK

Small tubing in Brass, Copper, Steel, Aluminum, German Silver, &c. Sheet Brass, Copper and German Silver. Copper, Brass and German Silver Wire. Brazed and Seamless Brass and Copper Tube. Copper and Brass Rod.

"Search-Light"

OIL and GAS

Bicycle Lanterns.

Send for Circulars and Electrotypes.

THE BRIDGEPORT BRASS CO.,
Bridgeport, Conn.

Postal Telegraph Building,
Broadway and Murray St., New York.
No. 77th St., Philadelphia. 85 to 87 Pearl St., Boston.



**PHOSPHOR-BRONZE
GERMAN SILVER**

**THE RIVERSIDE
METAL CO.,**
RIVERSIDE, N. J.

Matthiessen & Hegeler Zinc Co.,

LA SALLE, ILLINOIS.

SMELTERS OF SPELTER

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc cut to order. Rolled Battery Plates.
Selected Plates for Etchers' and Lithographers' use.
Selected Sheets for Paper and Card Makers' use.
Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

BRASS FOUNDERS FINISHERS **J. J. RYAN & CO.**

105-109 So. Jefferson St., Chicago.

Best Bronze, Babbitt Metals, Brass and Aluminum CASTINGS
On Short Notice

GERMAN SILVER | NICKEL ANODES BRASS, BRONZE, and COPPER The Seymour Mfg. Co., - - Seymour, Conn.

HENDRICKS BROTHERS

PROPRIETORS OF THE

Belleville Copper Rolling Mills,

MANUFACTURERS OF
Braziers' Bolt and Sheathing

COPPER, COPPER WIRE AND RIVETS.

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.
49 CLIFF ST., NEW YORK.

THE IRON AGE

New York, Thursday, November 22, 1906.

The A. S. & W. Double Twin Track Drill.

The portable four-spindle drill herewith illustrated is designed for the special work of drilling electric railroad rails to take rail bonds, but it contains a number of new and interesting features which may be adapted for other uses, especially in types of portable drills where more than one spindle would be desirable. It is manufactured and put on the market by the American Steel & Wire Company, Chicago, New York and Pittsburgh, in connection with its railroad bond department, and is the invention of Charles H. Oslund, Worcester, Mass., to whom a patent has been issued. Any number of drills may be embodied in the design, with centers but a short distance

hand wheel, as well as operated automatically while the drilling is in progress. On the feed screw shaft is fastened the ratchet *e*, Fig. 3, adjacent to which and rotatable on the shaft is the cam plate *d*. The function of this cam plate is to regulate the amount of feed by determining the number of teeth of the ratchet which shall be engaged by the pawl as it passes with the drill operating slide *g*, to which it is attached. The cam plate is adjustable and holds the pawl out of engagement as desired, the pawl riding on the edge of the plate excepting during the exposure of the required number of ratchet teeth.

The drills are held in rotary holders *e*, which are provided with bearings on the carriage. The outer end of each holder carries a ratchet wheel *f*. The drill operating slide, shown at *g*, Fig. 3, is arranged to reciprocate

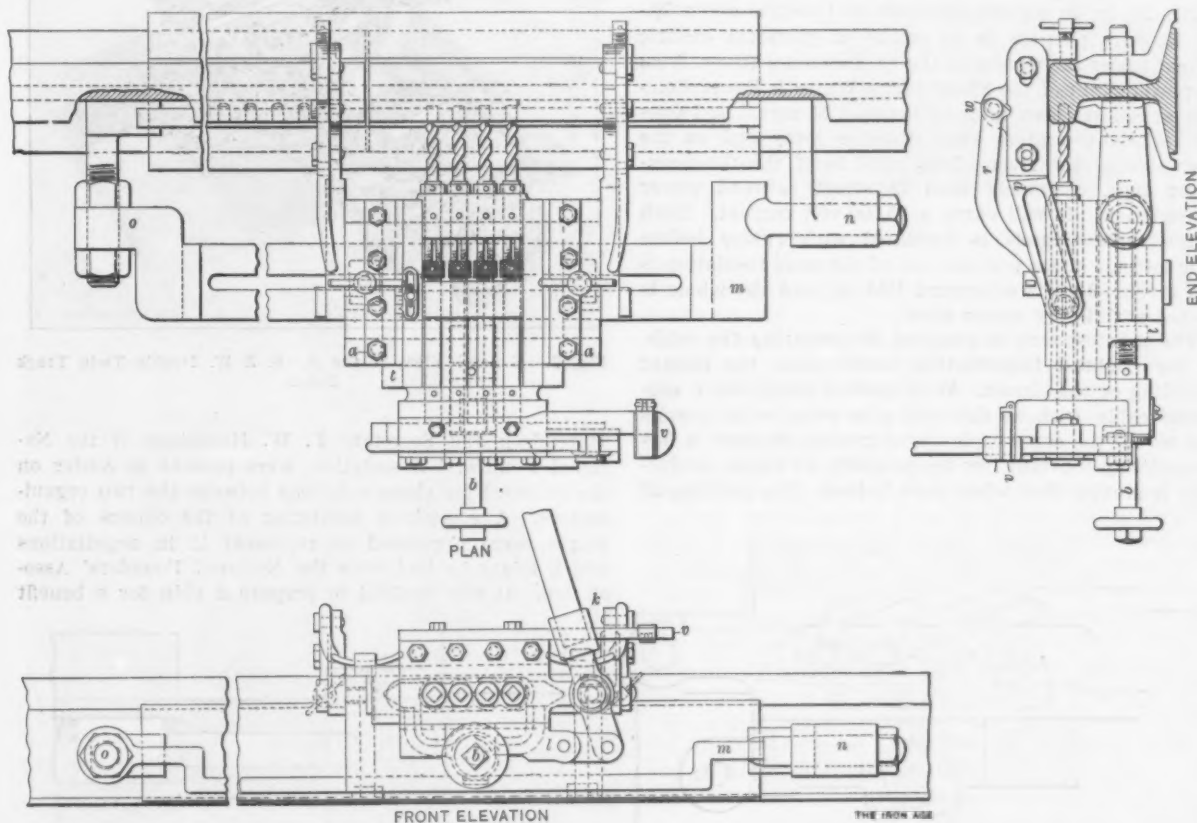


Fig. 1.—Plan, Front and End Elevations of the A. S. & W. Double Twin Track Drill.

apart, so that close drilling is possible. A general view of the device is shown in Fig. 2.

A notable feature of the drill is the mechanism employed in obtaining a continuous cutting motion of the drill during both movements of a lever handle operating a series of ratchets. A reciprocating slide, carrying two series of pawls, is arranged to engage ratchet wheels fixed to the drill holders, one series operating the drills during the forward stroke of the slide, the other series performing the function during the reverse motion. The action of the slide also actuates the feed, which may be regulated as desired. The carriage is adjustable parallel with the rail, and each drill is independently adjustable to the work. Dogs hold the machine rigidly to the rail, and there is an arrangement so that a train or car may pass without necessitating the removal of the machine.

The frame that carries the drill carriage is mounted upon a supporting bar which is rigidly clamped to the fish plates of the rail joint. The carriage rests in guides *a*, Fig. 1, and is moved to and from the work by the feed screw *b*, which may be adjusted to the work by a

cate transversely in guides *h*, on the extension of the carriage, and carries two sets of pawls, *i* and *j*. The pawls *i* are pivoted above the ratchet wheels, the pawls *j* below. The action of the slide in one direction causes the upper set of pawls to engage the ratchets, while the reverse motion of the slide engages the lower set of pawls, consequently the drill rotates continuously in the same direction. The slide is operated through the lever *k*, Fig. 1, which has a socket for a removable handle bar. The lever is connected to the projecting lug *l* on the carriage frame by a short link, and is pivoted to a projection on the slide. A stop arm for the lever is provided at *v*, Fig. 1.

The supporting bar upon which rests the carriage frame is rigidly fastened to the rail joint by a dog at either end. At one end is the swivel dog *n*, having a jaw which engages the fish plate, and at the other end is the dog *o*, which has a threaded adjustment, so that the drills may properly fit any curvature or unevenness of the rail. The drill frame is mounted upon the supporting bar *m*, and is fastened to it by clamping bolts through

an elongated slot in the bar, which permits the frame and mechanism of the machine to be moved longitudinally to the desired position. After longitudinal adjustment of the drills has been effected the carriage is firmly fastened to the rail by the two dogs. Each is secured by the slotted arm *p*, as shown in the end elevation in Fig. 1, which is pivoted to the carriage and carries a dog engaging the top of the rail, being held in engagement by a set screw. Pivoted to a lug, *w*, on each arm, *p*, is a finger, *r*, having a tooth which engages a notch in the dog. These dogs can easily be released to permit the passage of a train or car, without disturbing the adjustments of the drills. To adjust each drill individually each drill holder is formed with a slot, as shown in Fig. 4, in which is inserted a key that bears upon the end of the drill shank, and also against the face of a knurled nut or collar, threaded on the drill holder.

A Heavy Submarine Cable.

The Worcester Works of the American Steel & Wire Company have just completed the heaviest cable ever produced at these works, and probably one of the heaviest which has ever been manufactured. It is 6500 ft. in length, $2\frac{1}{2}$ in. in outside diameter and weighs about 70,000 lb. Its purpose is to convey a powerful electric current under the waters of the St. Lawrence River, from the power plant of the Shawenegan Water & Power Company at Shawenegan, midway between Montreal and Quebec, to asbestos mines some distance away and on the other side of the river. The cable is of the three-conductor type, commonly used in street railroad power transmission. It will carry a 25,000-volt current. Each of the three strands is insulated with rubber before being laid up, and a general coat of the same insulation is then given. Jute is afterward laid on, and the whole is covered with heavy armor wire.

The greatest care is required in preparing the cable, for the slightest imperfection would mean the instant grounding of the circuit. With perfect insulation a submarine cable such as this will give even better results than would the same cable above ground, because it has a practically constant low temperature, at which conductivity is greater than when there is heat. The problem of

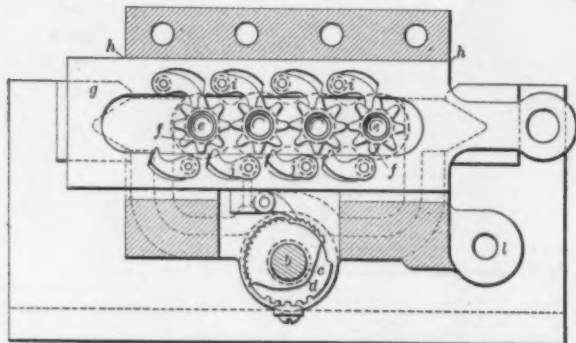


Fig. 3.—Detail Section Showing the Ratchets and Pawls for Rotating the Spindles.

laying the cable in the St. Lawrence is an interesting one. The depth of water varies from long shallows, where it is necessary to dredge in order to permit the passage of the cable boat, to a maximum depth of 60 ft. The current is somewhat rapid, which fact, coupled with the necessity of laying the cable in a straight line across the river, makes the handling of the cable boat by tugs a task of no small difficulty. Haste is being made to get the cable in place before the river is enclosed by ice. There are few instances in this country of conveying power currents by submarine cable. The Italian engineers have made a more common practice of it.

Morgan Rolling Mill Contracts.—The Morgan Construction Company, Worcester, Mass., has secured the contract for a 10 stand billet mill from the Lackawanna Steel Company, Buffalo, N. Y., this being the second Morgan mill installed by the company. It will be somewhat

similar in design to the mill recently started up by the Youngstown Sheet & Tube Company, Youngstown, N. Y. It will take blooms 7×7 in., and will reduce to billets varying in size from 4×4 in. to $1\frac{3}{4} \times 1\frac{3}{4}$ in. The Morgan Company has also secured the contract from the Vereinigte Koenigs & Laurahuetten Actien Gesellschaft of Osnabrueck, Upper Silesia, Germany, for a combination merchant bar, rod and hoop mill. The principal output of the mill will be small merchant bars and hoops.

The American Foundrymen's League.

At a recent meeting of the American Foundrymen's League, held in New York City, Commissioner W. L.

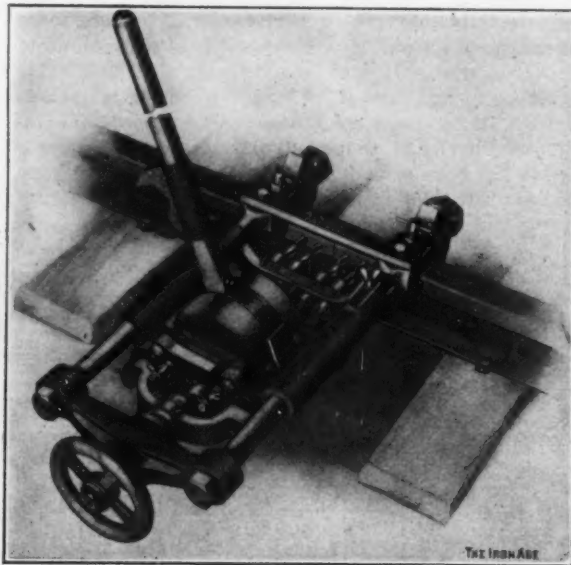


Fig. 2.—General View of the A. S. & W. Double Twin Track Drill.

Herendeen and Secretary F. W. Hutchings of the National Founders' Association, were present to confer on the proposal for closer relations between the two organizations. A committee consisting of the officers of the league were appointed to represent it in negotiations which might be had with the National Founders' Association. It was decided to prepare a plan for a benefit

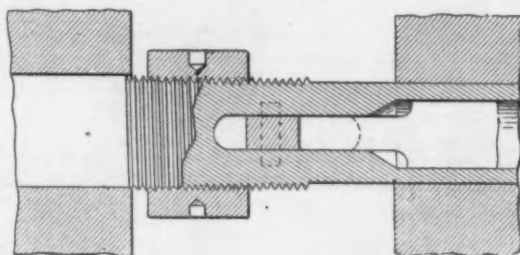


Fig. 4.—Detail of a Drill Socket Showing Manner of Adjusting the Drill Longitudinally.

fund for tried and faithful employees, help to be extended in case of illness and a stipulated sum to be paid the family of an employee in case of his death. Officers were re-elected as follows: President, E. C. Stearns, E. C. Stearns & Co., Syracuse, N. Y.; vice-president, Edward Gurney, Gurney Foundry Company, Toronto, Can.; treasurer, J. B. Jones, Utica Heater Company, Utica, N. Y.; secretary, William Sletcher, West Side Foundry, Troy, N. Y.

The London *Times' Engineering Supplement* says that the remarkable rise in the price of tin has led to investigations of abandoned and inadequately worked tin deposits in Cornwall. Engineers have been examining existing pumping and hoisting plants with a view to having more economic equipment adopted, but it is said there is little likelihood of any great opening for engineering enterprise in that part of the country.

The P. & W. Two-Spindle Profiling Machine with Belt Drive.

A two-spindle profiling machine, known as the No. 11, which, being intended for high cutter spindle speeds, has been arranged with belt drive for the spindles instead of the usual spiral gear drive to diminish friction and avoid heat, is a new product of the Pratt & Whitney Company, Hartford, Conn. In other particulars the machine is similar to the profiling machine that was first introduced by this company about four years ago. These machines are especially adapted for finishing the parts of guns, sewing machines and other accurate and interchangeable work. The two spindles allow the taking of a roughing and finishing milling cut at one setting of the work, finishing it accurately to the dimensions desired and doing away with hand fitting.

The driving pulley is a three-step cone with a fourth step which is belted to a back shaft on the rear of the machine. This shaft carries a drum $8\frac{1}{2}$ in. in diameter on which the spindle driving belts are free to travel when the spindle head slide is moved along the cross rail. The spindle pulleys are driven directly by 2-in. quarter-turn

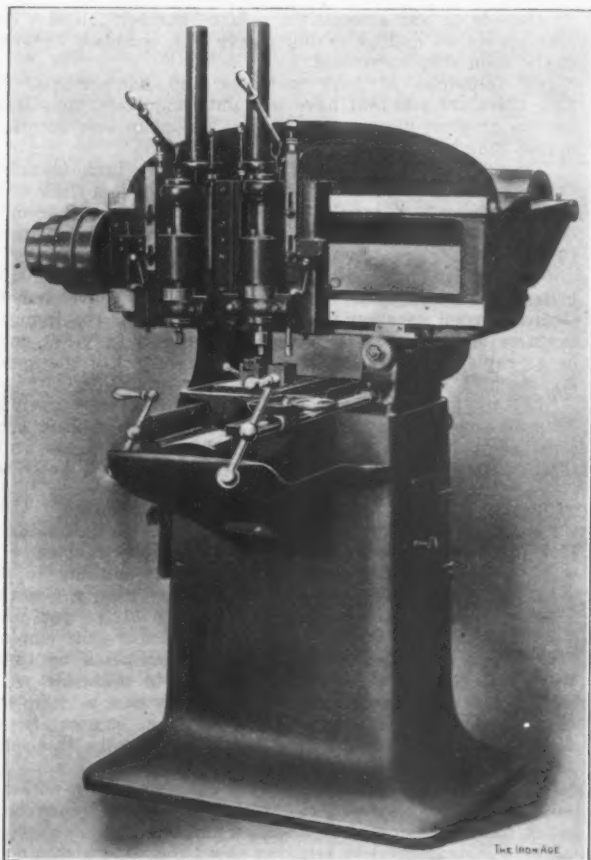


Fig. 1.—The No. 11 Two-Spindle Profiling Machine with Belt Drive, built by the Pratt & Whitney Company, Hartford, Conn.

belts and are 3 in. in diameter. They are mounted on hardened and ground steel sleeves running in bronze bearings, which are fastened to the cross slide. All the belt pull is exerted upon these sleeves instead of the spindles. The spindles are driven by the steel sleeves, in which they have a sliding fit, and run in the same kind of bearings as used in the standard spiral gear driven machines. The drum and all of the pulleys are counterbalanced. The countershaft speed is 480 rev. per min., and the speeds of the cone pulley are regularly 675, 480 and 340 rev. per min. The spindle speeds corresponding to these are 1160, 1640 and 2300 rev. per min., respectively.

The company is now prepared to furnish any of its several sizes of profiling machines with either gear or belt drive, as may be specified by the purchaser. Fig. 1 is a general view of the front and working side of the machine, which shows the means of traversing the spindle heads on the cross rail for cutting in a direction par-

allel with the rail and also for moving the work table transversely to the rail. Fig. 2 is a detail side view showing the spindle drive.

The Foundry Supply Association.

On behalf of the Foundry Supply Association, which recently perfected its organization at a meeting in Philadelphia, an announcement is made concerning the provisions for foundry equipment and supply exhibits in connection with the convention of the American Foundry-

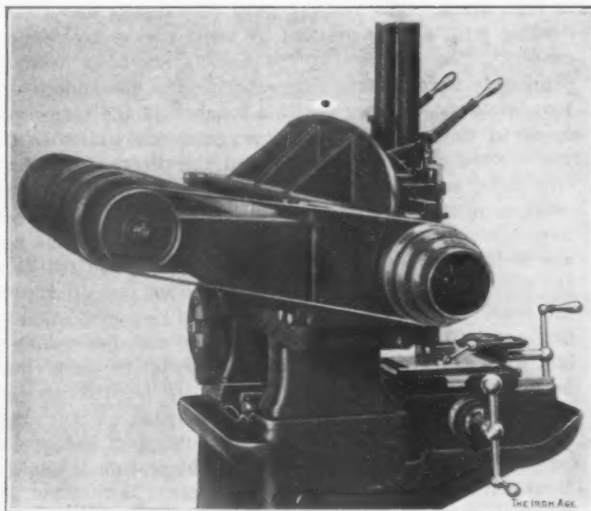


Fig. 2.—A Detail Side View Showing the Spindle Drive.

men's Association at Philadelphia in May, 1907. An armory has been secured which is 168 x 198 ft. A portion of the exhibits will be arranged in a lot 100 x 200 ft., adjoining the armory. These exhibits outside the building will include oil melting furnaces and such machinery as requires heavy foundations. A number of exhibitors have already applied for space. Secretary H. M. Lane, 610 Schofield Building, Cleveland, Ohio, reports a large number of applications for membership in the new association. It is expected that the attendance at the Philadelphia convention will number fully 1000 foundrymen and foundry foremen. In addition to the officers of the Supply Association, heretofore announced, the following have been elected trustees: Howard Evans, J. W. Paxson Company, Philadelphia, Pa.; Henry E. Pridmore, Chicago, Ill.; John Hill, Hill & Griffith Company, Cincinnati, Ohio; J. S. Smith, J. D. Smith Foundry Supply Company, Cleveland, Ohio; H. E. Mills, C. E. Mills Oil Company, Syracuse, N. Y.; U. E. Kanavel, Interstate Sand Company, Cleveland, Ohio.

Steel Passenger Cars.

The Pennsylvania Railroad Company has called for bids for the construction of 100 all-steel noninflammable passenger cars. This will be the first lot of such equipment to be made in accordance with the company's intention to build no more wooden cars. The decision on this point was hastened by the progress of the New York tunnel, through which the company will not run anything but absolutely fireproof cars. One experimental passenger car has already been built by the Pennsylvania, but the new cars will embody many improvements upon this one.

The company's shops at Altoona will complete now very shortly the all-steel baggage car which is in course of construction there, as well as an all-steel postal car—the first to be constructed by any railroad. They will be delivered about January 1. The motive power department has also just approved designs for an all-steel dining car, and an experimental car of this character will be started at once. The Pullman Company, at the instance of the Pennsylvania Railroad, is at work upon an all-steel noninflammable sleeping car. Some 500 such cars must be completed and prepared for service by the time the New York terminal is ready for operation.

The National Founders' Association.

Progress on Open Shop Lines Reported at the Tenth Annual Convention.

The tenth annual convention of the National Founders' Association, held at the Hotel Astor, New York City, November 14 and 15, was one of the most noteworthy in attendance and spirit in the history of the association. The registration list showed a total of 259 names, which is high mark. The reports were of unusual importance, dealing with a year marked by strikes in many foundry centers. The energies of the association have been expended as never before in combating the demands of the Iron Molders' Union. While a number of the men prominent in the councils of the organization in its earlier years were active participants in the discussions of the two days' sessions, many new faces appeared. The accessions to the membership in the past two or three years have brought not a few men of marked forcefulness who are to be reckoned as important factors in the future of the movement. While the year has been one of conflict, the conservative forces in the National Founders' Association are still strongly in evidence, and the discussions of last week's convention indicated no change in the attitude heretofore assumed, which is one of hostility not to unionism *per se*, but to what are regarded as the unjust exactions of the Molders' Union, resulting in uneconomic production and in putting the control of foundry operations largely in the hands of employees.

The President's Report.

Chief in interest of the features of the opening session on Wednesday morning was the report of President O. P. Briggs. The greater portion of it is given below:

This convention marks the close of the tenth year of the National Founders' Association. The year has been one of great prosperity in the foundry business; at the same time it has been attended with serious labor difficulties. The principal developments of the year were:

1. The Philadelphia strike.
2. The strike of May 2 in 47 plants.
3. Fourteen strikes subsequent to May 12.
4. The joint meeting on May 5 of the Council and the members whose shops were struck on May 2.
5. The special convention of May 12 at Chicago.
6. The referendum vote on closer co-operation with the National Metal Trades Association.
7. The resignation of Commissioner Caldwell and the engagement of W. L. Herendeen as commissioner.
8. The results obtained in combating the strike.

Philadelphia Shops Opened.

During the early part of the fiscal year the attention of the association was centered on Philadelphia, where 10 of our members were in the midst of the defense occasioned by the strike of October 27, 1905, just prior to the last convention. As time rolled round the strikers were defeated step by step, notwithstanding the fact that one of our members, the Girard Iron Works, surrendered to the union early in February. Gradually the union began to realize its defeat. Already it had suffered defeat in 45 shops in two years in its endeavor to force the closed shop in all its details.

The drastic measure adopted to help out Philadelphia was to demand strict closed shop, written agreements in a large number of the leading foundry centers, the union believing that many foundrymen would sign any agreement presented, in view of the great demand for molders at that time. They also believed that a number of foundrymen would resist, by reason of which the association would transfer enough of its molders from Philadelphia to cause the foundrymen there to promptly surrender.

The May Strikes

On April 28 we informed certain cities of what, in the judgment of your officers, was in store for them. Immediately following this date the demands referred to were presented in the cities designated. A number of foundrymen operating small shops signed with the union. In point of number of men involved those who signed were a very small proportion. The resistance of the foundrymen was far in excess of the union expectations, and on May 2 there were, according to various estimates, from 5500 to 7500 molders on strike in compliance with union orders. Forty-seven National Founders' Association shops were affected.

The Detroit meeting of the Administrative Council, the later special convention of the association at Chicago, and the decision to resist the closed shop demand of the

union and to assess the membership for any amount necessary to carry on the contest, and the measures taken to execute the will of the convention—all were discussed in detail in the following sections of the report. Being matters of history and already recorded in these columns they are omitted.

Results of the Contest.

On the question of written, closed shop agreements, we score a complete, unconditional surrender on the part of the union. Not a shop on strike on May 12 signed and the union has withdrawn the demand all over the country in its attempts to settle.

In 48 shops we have obtained a complete, clean cut victory, as nearly all of them are running at practically normal capacity with independent workmen and satisfactory results.

In 10 shops the men were taken back on the conditions obtaining when they went out, excepting no written agreements. These are running under union conditions in other respects.

Outside of our association, a large number followed the example we set and by so doing have won complete victories in the open shop movement.

Of foundries of both members and nonmembers, all told, there are 100 that have won out completely, thus scoring the greatest victory over radical unionism ever recorded in the foundry industry.

Due to this season's strikes there have been installed not less than 2000 molding machines, and not less than 4000 new men have been taught the molding trade more thoroughly than they could have been taught it in years under union rules.

The results obtained by both of these mediums have surprised the foundrymen beyond measure, and have demonstrated beyond question the important fact that the foundry business of this country has not progressed in years gone by as rapidly as it ought, due to union control of the molding machine and the limitation of apprentices.

Let us hope that the molding machine may continue its progress, and that young men of mechanical ability may continue to increase in numbers in the molding trade until this industry is second to none of the mechanical pursuits.

Parleying During Strikes.

I am again prompted to call your attention to one general principle in dealing with this vexatious problem. I refer to the necessity of having absolutely nothing to do with union officials during a strike. Every time you grant a union representative a hearing during a strike you prolong the struggle. When the union men leave your employ they forfeit every possible right of representation by their order and the proprietor who continues to negotiate with these officials during a strike will never win a complete victory. Do all your negotiating, trading, compromising, sacrificing and dickering before you allow a strike to occur. After it has occurred and you have made up your mind to defend yourself, cut off all negotiations and accept nothing but unconditional surrender. With but few exceptions this policy has been pursued this season and has been in a great measure instrumental in bringing about the results obtained.

The Issue.

I also again refer to the issue in this great strike, and repeat what I said to you on May 12, that it was one of radical unionism. In not one shop involved has the question of wages and hours formed a part of the issue to such an extent as could not have been settled in 30 minutes, had the unjust union restrictions been removed. In fact, the question of wages and hours has formed so insignificant a part of the issue in these 114 shops that I very much doubt if one journeyman molder in ten could tell you why he was on strike on May 3. The only reason they can give is, "Because the union officials told us to." In many cases arbitration was urged on all questions at issue and turned down flatly by the union. A certain business agent in the West said that they proposed to force the closed shop May 2. Later on, when the undertaking seemed more difficult than expected, he remarked that it would be fought out until either the union or the National Foundrymen's Association was bankrupt.

A fair illustration of the union's tactics is found in Milwaukee. The proprietors offered an increase to all their workmen in proportion to their qualifications and ability, but would not recognize any new minimum. The wages offered by these foundrymen would have raised all good men, and had they been accepted molders would have received, all told, from 5 per cent. to 8 per cent. more actual

money than they had asked for, in that the demand was for a raise in the minimum only, thus neglecting altogether the best workmen in the city. As usual, their union minimum idea was uppermost in their minds, and they were ready to sacrifice all their most skilled men so long as their poor men were raised and their principles maintained.

Some Lessons.

Prominent among the lessons taught in this strike are: The absolute injustice of the minimum wage principle as applied to skilled labor.

The mistake of employees in opposing the introduction of labor saving machinery.

The rank injustice to the rising generation in limiting its opportunity of learning a trade.

No organization can long continue that stands unequivocally for reducing all mechanics to the same level, compelling the competent to divide earnings with the incompetent. This principle gradually but surely lowers the standard of the craft. Neither can an organization long endure that persists in denying to young men the opportunity this country affords them to develop along the line for which they are best fitted, and to receive their reward in proportion to their ability.

Also prominent among the lessons taught is the duty we as manufacturers owe our loyal foremen. When such foremen have had this work in hand the greatest progress has been made, and the foreman who cannot honestly perform the work assigned to him when defending his employers on such an issue as that presented this year is blind not only to his own interest, but to that of mankind in general. It is manifestly our duty as employers to look after both the welfare and the attitude of our foremen, to understand them, to maintain their confidence, respect and strict loyalty. If such relations cannot be maintained then a change in foremen is imperative.

The greatest lesson taught is to our journeymen. If they expect to maintain an organization that will command the respect and good will of their employers it must be dominated by the conservative, fair minded element. It has been demonstrated beyond question that foundries can be operated, castings produced and success obtained in the foundry business in spite of the effort of arrogant union officials to the contrary.

Co-operation with the National Metal Trades Association.

The last convention directed that a referendum vote be taken on the subject of closer co-operation with the National Metal Trades Association, and that if the resolution carried your officers proceed to perfect the co-operation plan. The proposition failed to carry. The vote was close, however, many of those voting in the negative saying they were compelled to vote thus because of lack of knowledge of the proposed change. The council, therefore, maintained the committee appointed for the purpose, feeling that the matter might be revived at some later date. The officers of the association have been so busy during this season that there has been no opportunity to give the matter further attention. As heretofore we have co-operated with that association as well as all kindred associations, both national and local, to the greatest extent possible.

Literature to Workmen.

The Detroit office has had in charge the circulation of a limited amount of literature direct to the workingmen. The work has been conducted with the greatest care, it being the aim to spread before these people some of the most important facts concerning the craft in which they are interested, sending it direct to their homes, where it can be read and considered with the family, without the interruption and interference of the agitator always present on the street or at the shop. I believe this feature of the work has been most beneficial. If you will take the trouble to read the class of literature coming to these men continually, such as is offered them, for example, by the *Machinists' Journal*, the *Iron Molders' Journal* and the *American Federationist*, and bear in mind that this is about the only class of literature they receive, I believe you will agree with me that a reasonable sum used by the proprietors in placing before the men their side of the case in a conservative and proper manner, is money well spent.

I believe that at least three-quarters of the workingmen of this country are honest, well meaning, law abiding, fair minded citizens, and are amenable to reason; that every fair minded proprietor who can avail himself of an opportunity to place his side of the case before them reaps a reward many times the expenditure. Besides this, and more important to my mind, is the fact that this direct appeal to the good sense of the employee is most beneficial.

I urge you to consider the advisability of diverting a large portion of the money you are contributing to educate the proprietor to the work of educating the employee direct. I wish it distinctly understood that I am not advocating accomplishing this by means of the radical union. Let it go to the men themselves direct. I can but believe if the manufacturers of the country to-day would adopt this plan

much greater benefit would be derived than from a like amount of money invested in any other way.

Contract Molders.

During the season we have increased the number of our contract molders to some extent. It has been our aim continually to raise the standard of these men as rapidly as possible, by weeding out those who are undesirable and replacing them with those better suited to the work. It is my judgment that greater attention should be given to securing high grade instructors, men competent to go into a foundry on short notice and break in as many new men as possible when a strike occurs. Every instructor of this kind is rendering much greater service than the journeyman molder.

Finances.

The finances of the association are in splendid condition. Notwithstanding the enormous difficulties before us this season, but two special assessments have been necessary in addition to those ordered at the last convention. The reserve fund has been undisturbed. The payments for idle floors and running expenses of the association have been made promptly, and we have on hand at this time a large amount outside of the reserve fund.

Recommendations.

I would recommend to the incoming administration:

Retaining the present office and field force.

The employment of a few more high grade instructors in the molding trade.

The dissemination of a reasonable amount of carefully prepared literature to our workmen.

Maintaining and further perfecting our secret service.

That special attention be given to our apprentices and the education of as many molders as possible at your shops, also at the Winona Training School.

The development of molding machines as rapidly as our members find it consistent with their class of work.

With the greatest emphasis possible I wish to urge upon you the necessity of caring for your high grade, competent men.

With the large number of shops now in the association, it should be an easy matter to relegate to the background the iniquitous minimum wage principle, and grant every workman in your employ an opportunity to receive direct benefits in proportion to his ability, industry and power to produce. I urge you to guard this point carefully, and beg of you not to allow competent men to work for you at unreasonably low wages, believing that every case of this kind, where a good man is compelled to work for small wages or upon unreasonable conditions, forms the argument which, in the hands of union agitators, is effectively applied to their purpose. When such cases occur there is no defense, and it behooves us as employers to intensify our energies in protecting this class of workmen.

There is abundant evidence to support the statement that the conservative union molders are to-day more pronounced than ever before in their denunciation of the radical, irresponsible leaders who in most cases dominate the organization. They are handicapped in their efforts to extricate themselves from their present unfortunate position by want of competent leaders. There are but few workmen who have the courage to attempt such leadership in the face of the opposition of the radical element.

There are at this time two clearly defined courses for the conservative workman to pursue. One is to rally the support of all the conservative forces and purify the union; the other is to abandon the union altogether and join the ranks of the great unorganized. The real question before you at this time is, How to assist the high grade workmen to help themselves. We as employers must be ever on the alert in our efforts to assist our honest workmen and foster the education of conservative, competent men in this trade.

The Commissioner's Report.

The commissioner, W. L. Herendeen, devoted his report largely to issues growing out of the May strike. We make the following extracts, the first of which refers to the speedier results that might have been realized by united action:

Your officers realized perfectly that if the foundrymen of the country would co-operate and decline to increase their molding force, thus keeping on the strike payrolls practically the entire number of men affected at that time, the already depleted treasury of the union would soon be exhausted, and that on the inability of the union to pay further strike benefits a large percentage of their members would be soon desirous of securing the old jobs under open shop conditions. To this end, as you know, several circulars were sent out by our association to all the foundrymen of the United States and Canada. I regret, however, to state that the selfish and indifferent policy of many foundrymen who are not members of our association. Being short of molders they seized this opportunity of filling up their shops, enabling the union to get at once

good jobs for a large percentage of its strikers, thus cutting them off the union payroll. These men by securing work were able to pay their dues and special assessments, and the great strike of 1906, which in my opinion would not have lasted more than a month or six weeks at the farthest had foundrymen generally co-operated, has been greatly prolonged on account of this selfish, short-sighted and indifferent policy.

Pittsburgh as an Example.

Illustrating the many advantages of supporting an organization like the National Founders' Association, I refer to the demands at Pittsburgh in April, which were for \$3.50 and a nine-hour day, this minimum to be paid alike to floor molders, bench molders and coremakers. The machinists, pattern makers and boiler makers in Pittsburgh awaited the outcome with bated breath. The manufacturers of Pittsburgh refused to grant the demands, and before the day arrived when their decision was to be acted upon by the men the union officials found so many foundrymen had resisted and the number of molders on the streets of other cities was so large that they did not dare call out their members in Pittsburgh, notwithstanding that the Pittsburgh locals voted almost unanimously to strike. The saving in money alone to the manufacturers of Pittsburgh on account of the action which they unitedly took—and this action, in my opinion, largely due to the advice and counsel of officers of the National Founders' Association—will amount this year to several hundred thousand dollars. If the advances had been made in Pittsburgh and the \$3.50 minimum recognized, the demands in other cities for the Pittsburgh wage rate would have added still further burdens to the manufacturing interests of the country.

I believe it is generally recognized by thoughtful, broad gauge manufacturers that the determined stand taken by the National Founders' Association this year has saved large and costly strikes among the machinists, pattern makers and boiler makers, as these unions had all been watching carefully the contest which the molders were making, and decided to press their claims if the molders won out.

The Open Shop.

In September our association printed a list of nearly 400 open shops and this list was compiled after a careful investigation covering several months. We did not necessarily take the say-so of the owner of the shop. I regret to state that there are still many foundrymen in this country who will tell you very glibly that they run an open shop, but on investigation we find that no molder who does not possess a union card, or who will not take one out immediately on entering employment at one of these shops, is allowed to remain at work. The foreman, perhaps, unknown to the owners, acting on the pressure brought to bear by the union employees, finds an easy way to drop the man out or refuse to start him at work. Such shops we have omitted from our list. We believe that our list is not at all complete and that there are many other important foundries in the country operating open shops. In the next edition of this list their names will appear. But certainly this list disproves the oft-repeated statement of union agitators and walking delegates that a man must belong to the union in order to get employment—because in the number of open shops will be found many who make the most difficult and intricate castings and who employ the highest skill and the best paid molders.

I wish to call your special attention to the large number of open shops in Chicago, Philadelphia, Cleveland, Milwaukee, St. Paul, Minneapolis and Buffalo. I believe that in each of these places more than one-half of the molders are outside of union control. We have not only put this list of open shops in the hands of the foundrymen of this country, but have sent thousands of them to molders.

Increase of Molders.

The pernicious American system of allowing only one apprentice to eight molders which has been persisted in so many years in the machinery foundries of the country, together with the natural growth and increase of the foundry business, has produced a large shortage in the visible supply of molders. This scarcity has been felt by every employer in this country for several years, and last spring it was more of a handicap than ever.

The large number of strikes which have been successfully broken in the shops of our members, and in those of nonmembers who have acted in harmony with our members, have added more than 3000 new molders this year. This number, together with the large number of machine operators, coremakers and handy men, has gradually reduced the pressure felt by the employing foundrymen throughout the country.

It has been a matter of great surprise to the union officials that so many members of the National Foundrymen's Association were willing this year, at a time when foundries were busier than ever before in the history of the country, to refuse to grant their demands. They confidently counted on lack of co-operation and felt that the strikes they so

freely sanctioned in April would be over in a very few weeks.

The Association's Publication.

It will be of interest to note that during the year ending November 1, 1906, there have been printed and distributed over 100,000 copies of the *Review*. These have been sent not only to members, but many of them to nonmembers, covering all the principal foundries in the United States and Canada, and also many thousands have been sent to molders. We have received more than 1500 requests from molders, largely from those who are members of the union, to be put on our mailing list to receive the *Review* regularly. Some have acknowledged that they get more authentic information regarding the various strikes in the country from the *Review* than from their own publication, the *Iron Molders' Journal*. I believe that it is of great importance to print larger editions of the *Review* and to get them into the hands of union molders, because their own publication steadily suppresses the truth in regard to strikes. It often happens that the *Journal* continues to print each month that a strike is on at Utica, or at Erie, or some other town where for several years past the shops which had been involved in a strike have been running under absolutely normal conditions, with a full corps of workmen, and running successfully as open shops. The *Journal* evidently thinks that any admission of failure to win every strike hurts their cause. Our association has actually spent \$6400 in printing and postage in circulating the 100,000 *Reviews* the past year. In my opinion it would be wise to extend the scope of the *Review*, possibly change its name to the *Founders' Review*, solicit advertising, obtain second-class mailing privilege, and thus take it out of the expense column and make it self-supporting. In this way a larger number could be circulated without any expense to the association, and thousands of molders each month could be kept fully informed regarding labor matters in the foundries of the country, and the false statements contained in the *Journal* shown up. I believe this education of the molder of prime importance.

Employment Bureau.

The association has for some time maintained an employment bureau, and has the addresses of hundreds of independent molders in various parts of the country. This bureau has been of great assistance the past year in supplying molders to our members whose shops were affected by strikes. I believe that a very much larger percentage of the molders in the country are outside of the union than is generally supposed. In my opinion fully one-half are free and independent. Of course many of these men will not leave their employment in open shops to take positions, even at advanced pay, in struck shops, so great is their fear of personal injury; but it is the aim of the association to enlarge and perfect its employment bureau and to be able at any time to supply molders to our members who are in need of them.

We also have been able to put our members in touch with competent foremen, both for the foundry and coreroom, and we have usually on file applications from men competent to fill these positions, and after we have thoroughly investigated their references we always take pleasure in assisting them to secure employment. A large percentage of our contract men have been faithful and have rendered splendid service to our members.

Secret Service.

Our secret service department has been of inestimable value this year, as your officers have been kept fully informed of every move contemplated by the union. This information has saved the association thousands of dollars and has prevented many acts of violence which have been such an important feature in previous strikes. I do not wish to be understood as claiming that no slugging and no murders have been committed by the union this year; but I do wish to state that in my opinion, judging by past experiences, a large percentage of these disgraceful attacks have been prevented on account of the fear of punishment and the knowledge of our extensive secret service department.

Chicago School for Molders.

About September 1 a room was engaged in one of the old office buildings in the heart of the business section of Chicago and a school was opened for the education of young men who desired to become molders. Molding sand, patterns and flasks were contributed by Chicago members, and a competent and experienced molder, who had had experience as a foreman, was put in charge. Carefully selecting young married men under 30 who were ambitious to improve their earning ability and who had good references, our instructor started to teach them how to mold. The agreement was that the first three days the applicant devoted his time without compensation. At the end of that time, if the instructor concluded that the applicant had not sufficient qualifications to learn the business readily and make a success of molding, he was excused. If he showed ability he was then given \$1.50 per day, and at the end of 10 days he was graduated and immediately entered the employ of

some of our members, the member securing him paying the cost of his tuition. We have demonstrated that a young man having this preliminary education in molding can go into a foundry and begin immediately to make the simpler castings, and in a very short time can be of great benefit to his employer. I believe that similar schools should be opened in foundry centers, and that the supply of independent molders can be gradually increased at a small expense in this way. Many young men hesitate to go through a picket line and begin work in a foundry absolutely green, but if they have had two weeks' experience in a molding school and become convinced that they are capable of turning out castings and at once securing more profitable employment and an opportunity to perfect themselves in a trade which will yield them from 50 to 100 per cent. more pay than unskilled labor can get, they are not easily discouraged by the arguments and threats of the pickets.

The union puts an automatic brake on its members and prevents the ambitious man from rising and binds him perpetually to his class. Under such rules Horace Greeley would never have gone beyond the printer's case, Stephen Girard would have died a common sailor and Andrew Carnegie would still be working a telegrapher's key. Theirs is an effort to remove nature's inequality of capacity. The fundamental idea upon which rests the Declaration of Independence was equality of opportunity. Under their rules, once a molder always a molder. A caste is established and workmen are made prisoners within their own stratum of life. They are selling their birthright of to-morrow's greater opportunity for to-day's mess of pottage. It is said in the navy, "He came up through the hatchways," meaning that an officer now risen into prominence was originally a common sailor. Admiral Farragut rose thus. The union closes the hatchways, cuts off the individual from exercising his superior talent, making it far more difficult for him to secure promotion. Charles M. Schwab came up through this human hatchway. The logical end of secret labor organizations is socialism, working its way out along the lines of the old Oneida community or Dowie's "New Zion," and if the American foundrymen could understand the great hardship which labor unions have brought to their fellow manufacturer in England and the fearful handicap that they have put upon his efforts none of them would submit to union domination of their shops.

England as an Example.

In the concluding portion of his address Commissioner Herendeen referred to the programme of radical unionism in England as seen in the demands of the British Trades Union Congress for an eight-hour day, a minimum wage for all Government employees, compulsory "references" for all discharged employees, nationalization of all mines, railroads, canals and mineral resources, with power to municipalities to engage in municipal trade. The congress also opposed the issuance of injunctions in connection with trade disputes. In the British Parliament the Labor party advocates free meals for school children, municipal ownership of public utilities, the sale of coal, bread and dairy products by municipalities, state provision of work for unemployed, old age pensions, the legalizing of picketing and the passage of laws relieving trades unions from any liability to be sued for their acts in strikes and lockouts. It was pointed out that if American manufacturers do not act together they may expect increasing compliance by Congress with similar demands from organized labor in the United States.

The Secretary's Report.

The secretary, F. W. Hutchings, presented a report dealing with the developments of the year in his office—the statistics of membership, strikes, &c. The present membership of the association is 475 firms, operating 531 plants, and five applications are pending. The work of the year was so largely in the line of establishing new conditions in the shops of the membership that a less active campaign was carried on than in former years to add to the number of new members. Emphasis was laid in the report on the importance of disseminating literature among foundry employees, the efforts in this direction in the past year constituting the first systematic work of the kind undertaken by an employers' association. The results had been such that the officers of the association favored even a larger expenditure in this direction in the future. Referring to the progress made in the past year in opposing the union limitation of output the secretary noted reports showing increases ranging from 10 to 60 per cent., and stated that a conservative estimate would put the average increase between 15 and 20 per cent.

WEDNESDAY AFTERNOON.

Reports from strike centers were taken up at the Wednesday afternoon session. Chicago, as one of the most prominent storm centers, was called on first, and William H. Winslow of Winslow Brothers Company responded. Out of 19 shops in which the proprietors took a stand against the demands of the union 18 stood pat and won out. The output of these foundries to-day as compared with that in April, 1906, just before the strike, ranges from 65 to 130 per cent., and most foundries are making 100 per cent. of their April output. The character of the working force in these open shops is improving steadily. The speaker's company has introduced 24 molding machines, all but one operated by Poles, and these operators with six months' experience are now producing almost double the output of the molders who had preceded them. At present the machine men are being paid day wages, but later the company expects to introduce the premium plan. Particular mention was made of the fact that machine operators are producing newels at the rate of six a day, whereas the molders produced two a day. The piece is one, in fact, which it would ordinarily be considered impossible to produce by machine molding. In all of the 18 Chicago shops the entire force of employees to-day consists of men introduced since the strike in May. Summarizing the results in Chicago, Mr. Winslow said: "We have planted, cultivated and grown 18 open shops in that hotbed of unionism."

Good Results with Molding Machines.

S. L. G. Knox of the Bucyrus Company, Milwaukee, reported in detail the progress that has been made in that city since the strike. In 17 foundries employing 1312 men 1100 men went out, leaving 212 handy men and apprentices as the nucleus for the present working force. Four foundries employing 140 molders signed an agreement with the union; in the other foundries the average output to-day is 83 per cent. of the output before the strike. This figure is arrived at by giving the percentage of the smaller shops the same weight as the percentages of the larger shops. Counting tonnage the struck shops in Milwaukee are now producing over 90 per cent. of what they turned out before the strike. At the West Allis foundry of the Allis-Chalmers Company the percentage is 110. In another large foundry the present output is 130 per cent. of that reached in the days before the strike. Before the strike 52 molding machines were operated. To-day the number is 172. The speaker gave some details of production at the iron and steel foundries of the Bucyrus Company. Before the strike the union molders asked to have machines put in charge of molders. To-day every man in both foundries is new. Every one of these men is doing more work than any molder performed before the strike. Previous to May the molders would not permit work over 100 lb. to be put on a machine. To-day work weighing as high as 1500 lb. is going on machines. Of one casting weighing 250 lb. the output before the strike was four from one man at \$3.25 per day. To-day 35 of these pieces are made by one machine man at \$2.25 a day, with part time of a helper. Before the strike four 100-lb. pinions were made by one man in a day. To-day the output is 35 per day. Of 100-lb. bearings five per day were made before the strike. To-day the output is 33. Of another casting two a day were produced before the strike, against 18 now. One 900-lb. cross beam for steam shovels was produced per man per day previous to the strike. Now six per man per day are turned out. In the steel foundry there was no machine work before the strike; now 21 per cent. is produced on machines, and this percentage will be increased to 33 in the near future.

George C. Forgeot, general superintendent of the Allis-Chalmers Company, reported for its Milwaukee shops. In April, before the strike, the company had 8 or 10 molding machines. To-day it has 58. Several instances were cited of a marked increase in output by the use of machines. In the case of hangers, for example, the company formerly got five a day per man, and now a man with a machine produces 15. At the West Allis shops of the

company the output to-day in various lines ranges from 95 to 115 per cent. of that secured before the strike.

In the Twin Cities.

Oliver Crosby, of the American Holst & Derrick Company, said that the St. Paul and Minneapolis foundrymen were in a fair way to settle with their molders without a signed agreement, and the May strike would have been avoided but that the president of the Iron Molders' Union insisted on every shop signing up with the union. The first move of the foundrymen was to put men who had been doing guard duty at work on molding machines. The result has been very satisfactory and shops in that city are now securing large castings and good castings from men whose only experience in the foundry dates from the early part of May. Out of eight foundries in the Twin Cities which were members of the association three signed an agreement. These employed 75 men. In the other shops 144 union men have been displaced.

Speaking for Beloit, Wis., President Briggs said that molding machines are now in use and the output in the struck shops is 140 per cent. of that secured under union conditions before the strike.

C. H. Cole, president of the United Iron Works Company, Springfield, Mo., recited the experience of his company in its five struck shops. At the outset strike breakers were brought in but did not stay. The company then started to break in green men, employing for the most part young men from 18 to 20 years of age. A few experienced molders were used as instructors. In three or four months' time the new men were doing practically as good work as the molders who went out. At the Springfield plant the average output is 100 per cent. of that before the strike. At the Iona, Kan., plant the present output is 150 per cent. of that previous to May. The other plants are averaging 100 per cent.

Concerning the strike at Scranton, Pa., in the shop of the Allis-Chalmers Company, it was reported that the men appeared to have gone out because they were paid too much. The minimum asked for was 15 cents less than the company was paying. Out of eight shops in which strikes occurred at Scranton four belong to the N. F. A. One independent shop has been doing effective work and the striking coremakers have been replaced by women. The National Founders' Association, it was said, has done effective work at Scranton. As a matter of comparison, the case of an outside firm was cited which had secured 400 men from a detective agency and spent \$30,000 to \$40,000 fighting the strike. After all this the firm finally signed with the union. With the help of the National Founders' Association it was suggested that this firm could have been saved \$15,000 to \$20,000 and would have secured an effective force of independent workmen.

Half of Buffalo Molders Nonunion.

Lyman P. Hubbell of the Fillmore Avenue Foundry Company, Buffalo, reported that in that city there are to-day 12 open shops that were union shops before the strike. As against 358 union men formerly employed, these shops now have on their payroll 298 molders, apprentices and handy men. Three shops are producing 20 per cent. above their normal product. Of the balance the output is 10 to 30 per cent. below normal because of lack of men. Good results have been obtained in some shops by the use of molding machines. A case was cited in which the molding cost was \$11 a ton in April, and to-day \$9.20 a ton. The apprentice ratio is 4 or 5 to 1. Over 50 per cent. of all the molders at work in Buffalo to-day are in open shops.

Open Shop Conditions at Philadelphia.

The Philadelphia strike, which was the principal labor trouble on the hands of the association one year ago, was reported on by Stanley G. Flagg, Jr., chairman of the Third District Committee. In the earlier days of the strike there had been a good deal of violence, but to-day this has disappeared and picketing is a thing of the past. Twenty-six union molders have returned to work, one-half of these going back in one shop. Nine foundries were involved. At one foundry the demands of the union were finally granted. On November 3 the output in the struck shops was 90 per cent. of that previous to the strike, the falling off being due in part to a change in the character

of work in some instances. To-day there are at work 174 learners, apprentices and handy men, as against 66 previous to the strike.

The experience of William Sellers & Co., Incorporated, Philadelphia, was narrated by J. H. Schwacke. This firm has long employed molding machines, having used them as far back as 1800 and during the Civil War in the manufacture of shot and shell for the Government. At the beginning of the strike it had 15 machines, and one has been added since, the machine work consisting of pulleys, bearings, hanger frames, saddles for boring machines, &c. The company is now making preparations to put a larger class of work on machines. With five laboring men it had recently turned out 26 flasks containing 78 pieces, handling in the operation 60 tons of sand.

A report from the Williamson Brothers Company, Philadelphia, was to the effect that its success in operating to-day is largely due to molding machines.

The Utica Strike Over.

John B. Jones, Utica Heater Company, called attention to the fact that the strike at Utica, N. Y., is now not costing the association a cent, and the members of the association there are perfectly happy. Most of the striking molders have left the city. Out of eight foundries five are open shops, and from 50 to 60 per cent. of the molders in Utica to-day are nonunion. More work is being turned out than at any other time. In this connection President Briggs cited as an illustration of the falsity of stories circulated on behalf of the union, one to the effect that the foundrymen of Utica were on the point of capitulating. The position of the International Heating Company of that city was described by its representative, George E. Camp. Squeezers, stripping plate and air machines are employed. The speaker raised a laugh by saying that the shop now has an apprentice ratio of 110 to 1.

H. N. Covell, Brooklyn; W. H. Winslow, Chicago, and S. L. G. Knox, Milwaukee, were appointed a committee on the publication of the reports of conditions in the various centers at which strikes had occurred.

One thing emphasized in connection with the reports of decreased molding cost was that the aim of the foundrymen was not to reduce wages. It was the uniform statement that no issue on increased wages would have been raised by the proprietors; what was objected to was the demand for a signed agreement and in some cases the establishment of an increased minimum without regard to the deserts of the most skilled men. It was stated that higher wages would be paid where increased output warranted, and the effort in open shops is not to reduce, but rather to increase individual earnings, the proprietor being compensated by an increase in output and a diminution in unit cost.

WEDNESDAY EVENING.

It is the custom to hold a subscription banquet on the night of the first day of the convention. This was given on Wednesday evening at the Hotel Astor, 152 members and guests being in attendance. The affair was thoroughly successful and was marked by the cordial good fellowship engendered by years of co-operation in a common cause. The after-dinner speaking was presided over by Irving H. Reynolds of the Wm. Tod Company, Youngstown, Ohio. Before introducing the speakers Mr. Reynolds asked the company to rise and in a moment of silence to pay tribute to the memory of Fred T. Towne, a past president of the association, whose death had occurred since the last convention.

Congressman Littlefield on the Injunction.

Congressman Charles E. Littlefield of Maine was introduced as the speaker of the evening, and was given a rousing ovation. The fact that Mr. Littlefield had been marked for defeat at the recent election and had been actively opposed on the stump by Samuel Gompers, president of the American Federation of Labor, made his appearance of unusual interest. The reason for the opposition to Mr. Littlefield is well known, and hence House Bill No. 4445 naturally formed the theme of the latter's address. The purport of this bill, as has been explained in these columns frequently, is to exempt labor unions carrying on strikes from the operation of injunctions by

courts. What Congress was asked to do was to enact that no agreement entered into in connection with any trade dispute for the performance of certain acts by those on strike shall be considered unlawful, unless such acts are unlawful when committed by one person. The speaker pointed out that the bill was an express license to labor organizations to conspire, to threaten to intimidate, to coerce, or even to threaten to commit murder. The bill in the identical form in which it is now presented at each session of Congress had been first presented before that body in 1889 when the speaker first took his seat in the House. In forcible language that brought ready response from his hearers Mr. Littlefield showed how he had pressed home upon the labor leaders as they appeared before the House Judiciary Committee the real purpose of the bill. He had asked them whether they desired leave to conspire to threaten to commit murder and to do other unlawful things, and invariably they had answered in the negative, yet when asked why they were insisting upon the passage of a bill which conferred that very license upon them, they had been unable to give a more satisfactory answer than that similar legislation existed in Great Britain. Mr. Littlefield read from the acts of Parliament on this subject and showed wherein they differed very materially from the legislation asked for by the labor unions in the United States. The entire address was a most masterly discussion of the subject and constituted one of the most striking events in the association's banquet history.

Following Congressman Littlefield, Arthur A. Hamerschlag, director of the Carnegie Institute, Pittsburgh, spoke interestingly of the work he has so successfully initiated. The last speaker of the evening was James A. Emery, secretary of the Citizens' Industrial Association of America. Though coming late on the programme, Mr. Emery's eloquence and earnestness won him a close and enthusiastic hearing.

Always a feature of interest at the annual dinner, the testimonial to the president, as delivered by O. P. Letchworth of Buffalo, became of particular interest in view of what has been accomplished the past year under Mr. Briggs' leadership. In feeling words Mr. Letchworth expressed the obligation of the association to Mr. Briggs, and concluded by handing him a substantial check and a gold watch with suitable inscription. Mr. Briggs' reply evoked a spirited tribute of applause.

THURSDAY MORNING.

John L. Ketcham of the Brown-Ketcham Iron Works, Indianapolis, took the floor at the opening of Thursday's morning session to present the report of the Committee on the School for Foundrymen connected with the Winona Technical Institute at Indianapolis. At the convention of 1905 the association had voted \$1000 to establish a foundry trade school at the Winona Institute. Later the association's committee, consisting of William H. Pfahler, Philadelphia; William Gilbert, Cincinnati, and the speaker, visited the Winona Institute and looked carefully into the work being done. Recognizing that a foundry building was essential for any effective work in the proposed new department, the committee had agreed with the officers of the institute to raise \$5000 for such a building, the institute agreeing to provide a similar amount. This building has been completed, the expense, which the committee had guaranteed, running up to \$6400. Complete equipment has been supplied, and the foundry school was started on October 1 with six boys under instruction. This number, it is expected, will be increased to 25 by the end of the year, and there are accommodations for 50. Mr. Ketcham emphasized the value of the school to the members of the association in training young men to enter the foundry as molders, with the expectation that many of them, through the advanced work provided in the course at Indianapolis, would be able to take positions eventually as foremen or superintendents. The great present need, according to the speaker, is boys, and he appealed to the members to send boys from their various localities and guarantee the amount necessary for their support while taking the course of instruction in foundry work.

The Work of the Winona Foundry School.

Edward A. Johnson, director of the foundry department at Winona, explained the scope of the work and the character of the instruction. Following his address there was a general discussion of the best method of utilizing the facilities at Winona, as well as of the general subject of foundry apprenticeship. In fact, the apprenticeship discussion has come to be a regular feature of the conventions of the association. Doubt was expressed by one speaker of the advisability of building up a great trade school. Such a policy, it was suggested, would result in the individual foundrymen giving less attention to the making of molders. Another problem such a school presented was the disposition of the product turned out. The incentive to make good commercial castings would be lacking if the plan were adopted of making castings which later were simply scrapped and remelted. On the other hand, if the product of the school were to be put on the market a selling department must be organized and business conducted on the lines followed by manufacturing companies generally.

Another suggestion brought out in the discussion was that the Winona school would be made most quickly and directly serviceable to the members of the association if the effort were made simply to teach in a short time the essentials of the molding trade, ruling out other features of the curriculum of the ordinary trade school, which, while valuable, do not bear directly upon the molder's work. In presenting this suggestion William Lodge, Cincinnati, who is chairman of the Trade School Committee of the National Metal Trades Association, said that the chief trouble he has observed with young men coming from technical and trade schools is that they did not appreciate the value of time. While their work is often good it is done without reference to the time consumed or the price which the work will bring in the market.

Another member believed a correspondence department of the Winona school would be of value. Such a course could be taken even by the members of the association, who would then be better prepared to undertake the instruction of apprentices in their respective localities.

Several of those who spoke had found that one of the chief reasons for the failure of foundrymen to secure apprentices was that sufficient inducements were not offered. The experience at Chicago in breaking in new men at the foundries had suggested that men could be induced to leave other lines of work, as for example, street railroad service, and enter the foundry, if they were paid better wages at the start.

President Briggs took the floor to correct some impressions which seemed to exist concerning the Winona Institute. The institution he had found after careful investigation was entirely nonsectarian; the foundry instructor had had four years' experience in the foundry and was regarded as entirely capable for the work. It was the opinion of the speaker that commercial considerations should govern in the conduct of this school—that is, that castings should be made with a view to selling them in the market.

The discussion was participated in by J. H. Schwacke, William Sellers Company, Philadelphia; John Knickerbocker, Eddy Valve Company, New York; James F. Lallagan, Davis Foundry Company, Lawrence, Mass.; Thomas E. Durban, Erie City Iron Works, Erie, Pa.; William H. Winslow, Winslow Bros. Company, Chicago; John B. Jones, Utica Heater Company, Utica, N. Y. The whole question of apprenticeship and of the relation of the association to the Winona Foundry School was referred to the present Committee on the School, with instructions to put that institution on a commercial basis. The members of the committee who had personally made advances for the completion of the building were reimbursed for such expenditures.

Legal Questions.

George F. Monaghan, Detroit, the attorney of the association, took the floor in the last hour of the Thursday morning session and went at length into questions of law and of equity growing out of labor troubles

and the relations of foundry proprietors to their employees. The speaker devoted considerable time to the law and precedents on the injunction against striking employees. The procedure to be adopted by employers in certain contingencies was outlined by the speaker and valuable advice was given. For a full half hour after his address the speaker answered questions put to him by various members touching on the rights and obligations of employers, and the best method of securing them these rights. The address was clear, clean cut and effective, and the information given was of such value and so well calculated to save employers from the mistakes often made in connection with strikes that a digest of Mr. Monaghan's remarks was ordered printed and distributed among the membership. In the same connection it was decided to publish for general distribution the address of Congressman Littlefield at the banquet of Wednesday night.

THURSDAY AFTERNOON.

At the beginning of the last session of the convention the report of the Committee on Local Organizations, Irving H. Reynolds, chairman, came up for action. The committee did not favor local branches of the association. It is often true, the committee urged, that elements of weakness due to local conditions are introduced into labor contests when conducted through the medium of a local association. However, close relations with local organizations were favored and it was suggested that a plan under which resident district secretaries might be stationed in prominent foundry centers could be made very effective. If this were carried out the committee argued that district committees would be relieved of much of the work now falling to them and the membership of such committees might then be reduced to two instead of five. The plan would also involve some re-arrangement of territorial lines. It was recommended that a new committee be appointed to draw up the changes in the constitution and by-laws required for the carrying out of the new scheme. The report was adopted.

George E. Emmons, General Electric Company, Schenectady, presented the report of the Special Finance Committee, analyzing the expenditures for the past year and making comparisons with the financial exhibit of the preceding year. The reserve fund of the association has been kept intact in spite of the large expenditure necessitated by the strikes of the year, and provision was made for a substantial increase of the reserve fund in the coming year.

In discussing the question, "What are we to give the independent molder and coremaker in place of a union," I. W. Frank referred to the responsibilities devolving upon foundrymen by reason of the developments of the past year and the very considerable increase in the force of independent workmen. He said that a square deal was the solution of the problem presented, and pointed out how foundrymen should make it an object to the free men in their employ to remain in an independent position.

Election of Officers.

The report of the Nominating Committee was presented by I. W. Frank, who prefaced the nominations with a statement of the considerations that had led the committee to recommend a new policy. The committee believed the time had come to secure a permanent president who should also perform the functions of commissioner. The policy of the association having become well established and the membership being agreed as to what they wanted to do, the work could now be more efficiently carried on with continuity in the office of president. The committee had been unable to persuade Vice-President Carpenter to accept the presidency under these conditions. They had, however, succeeded at last in overruling the objections of President Briggs and were gratified that they could present his name for the presidency for the ensuing year, an announcement that was received with strong demonstrations of approval. A condition imposed by Mr. Briggs involved the removal of the headquarters of the association from Detroit to Chicago, and this the committee had decided was advisable. Messrs. Birmingham and Winslow escorted Mr. Briggs to the chair.

The committee announced that W. L. Herendeen, who had served the association so acceptably as commissioner in the past year, did not desire re-election. A vote of thanks was given Mr. Herendeen for his excellent work.

Secretary F. W. Hutchings was recommended for re-election, and the committee paid a high tribute to his efficiency. Appreciative mention was made also of the work of Assistant Commissioner McClintock, and of the special representatives of the association in the field, Messrs. McKinley, Taylor and Ersig, who had conducted its operations in the various centers in which strikes had been under way.

The Western Trust & Savings Bank of Chicago was elected treasurer of the association, succeeding in this office the State Savings Bank of Detroit. Following the custom of past years William H. Pfahler was elected an honorary member of the association as well as of the administrative council. The Nominating Committee also recommended names for the district committees. The latter, immediately after the adjournment of the convention, met to elect chairmen and vice-chairmen. The list as thus organized is as follows:

First District.—A. W. Whitcomb, chairman, Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass.; A. N. Abbe, vice-chairman, P. & F. Corbin, New Britain, Conn.; F. H. Brown, Davis & Farnum Mfg. Company, Waltham, Mass.; J. D. Hunter, James Hunter Machine Company, North Adams, Mass.; James F. Lanigan, Davis Foundry Company, Lawrence, Mass.

Second District.—F. E. Wheeler, International Heater Company, Utica, N. Y.; G. E. Emmons, Edison General Electric Company, Schenectady, N. Y.; G. H. Johnson, Isaac G. Johnson & Co., Spuyten Duyvil, N. Y.; A. C. Stebbins, Niles-Bement-Pond Company, Plainfield, N. J.; T. L. Richmond, Buffalo Scale Company, Buffalo, N. Y. (Chairman and vice-chairman not yet elected.)

Third District.—Thomas E. Durban, chairman, Erie City Iron Works, Erie, Pa.; J. H. Schwacke, vice-chairman, William Sellers & Co., Incorporated, Philadelphia, Pa.; John E. Harbster, Reading Hardware Company, Reading, Pa.; Stuart R. Carr, Stuart R. Carr & Co., Baltimore, Md.; E. L. Dawes, Standard Sanitary Mfg. Company, New Brighton, Pa.

Fourth District.—Irving H. Reynolds, chairman, William Tod Company, Youngstown, Ohio; Walter D. Russel, vice-chairman, Russel Wheel & Foundry Company, Detroit, Mich.; H. P. Ranney, American Shipbuilding Company, Cleveland, Ohio; R. H. Jeffrey, Jeffrey Mfg. Company, Columbus, Ohio; William Gilbert, Buckeye Foundry Company, Cincinnati, Ohio.

Fifth District.—W. H. Winslow, chairman, Winslow Brothers Company, Chicago, Ill.; J. W. Gardner, vice-chairman, Gardner Governor Company, Quincy, Ill.; C. R. Stephens, Moline Plow Company, Moline, Ill.; T. R. Kackley, Atlas Engine Works, Indianapolis, Ind.; William Medart, Medart Patent Pulley Company, St. Louis, Mo.

Sixth District.—George C. Forgeot, chairman, Allis-Chalmers Company, Milwaukee, Wis.; A. J. Brawley, vice-chairman, South Park Foundry & Machine Company, St. Paul, Minn.; George H. Smith, George H. Smith Steel Casting Company, Milwaukee, Wis.; Nathaniel French, Bettendorf Metal Wheel Company, Davenport, Iowa; H. M. Wallis, J. I. Case Plow Works, Racine, Wis.

Seventh District.—H. Cockshutt, chairman, Cockshutt Plow Company, Ltd., Brantford, Ont.; Edgar McDougall, vice-chairman, John McDougall Caledonian Iron Works Company, Ltd., Montreal, Que.; R. J. Whyte, Frost & Wood Company, Ltd., Smith's Falls, Ont.; Frederic Nicholls, Canada Foundry Company, Ltd., Toronto, Ont.; John M. Taylor, Taylor-Forbes Company, Ltd., Guelph, Ont.

Eighth District.—E. A. Watson, Caldwell-Watson Foundry & Machine Company, Birmingham, Ala.; A. D. Schofield, J. S. Schofield's Sons Company, Macon, Ga.; D. T. Smith, Continental Gin Company, Birmingham, Ala.; D. A. Tompkins, D. A. Tompkins Company, Charlotte, N. C.; Exile Burkitt, Southern Engine & Boiler Works, Jackson, Tenn. (Chairman and vice-chairman not yet elected.)

A Tribute to William H. Pfahler.

At Thursday morning's session of the convention Wm. S. Hallowell, Philadelphia, was appointed to convey to Wm. H. Pfahler, the "father of the association," resolutions of appreciation and *bon voyage* adopted by the "alumni" at their banquet on Tuesday evening and ratified by the Administrative Council. Mr. Pfahler, who has been in ill health for some time, sailed for Europe on Thursday.

Before the adjournment of the convention it was reported that in view of the pleasant experience of the ladies in connection with the meeting it was proposed to organize a ladies' auxiliary. The idea was well received and the attendance of ladies is expected to be made a feature at subsequent conventions.

Ore Shipments Diminishing.

DULUTH, MINN., November 17, 1906.—Ore shipments have been slow the past week from old ranges. Some of the railroads have practically cleaned up their mines, and are almost through business; others, especially on the Mesaba range, are pushing as fast as weather will permit, and will continue to do so till the close of navigation, whenever that may be. Under ordinary conditions of recent years there should be three weeks of navigation from the head of Lake Superior after to-day, but winter may arrive so speedily that this estimate will be badly cut. For the past few days conditions have not been favorable for shipments, the weather having been cold enough to thicken the wet ores coming from many mines to such a degree that they have run through docks very slowly. Just now there is a severe northeast storm that is impeding navigation and stopping dock operations. Very little ore is sent out of Lake Superior after December 1; last year less than 400,000 tons, in 1904 about 300,000 tons, and in 1903 75,000 tons. This means not only ore loaded at docks during the month, but the loading of the last two days of November, and there certainly was a pressure in the closing days of 1905 to get everything forward possible. October shipments for this year, out of Lake Superior ports alone, that is excluding Escanaba, were 4,304,000 tons; for the year before 3,816,000 tons. November shipments in 1905 were 2,722,000 tons. For the present month they will make a new record, and should amount to about 4,000,000 tons from all ports, Escanaba included.

Railroad Operations.

The Minnesota railroads are pushing operations, and the Oliver Mining Company, especially of all the mining interests of the State, is shoving ore to dock as fast as possible, and without any apparent notion that the end of the season is approaching. On Friday morning this week there were 215,000 tons of ore capacity at the Duluth, Missabe & Northern docks or due there during the day, and the Duluth & Iron Range was also shipping heavily. Twenty-one of the largest ore vessels of the lakes were lying in Duluth harbor waiting loads that morning, most of them to be taken care of during the forthcoming 24 to 36 hr. The docks of the Duluth, Missabe & Northern up to the close of business November 15 has shipped 800,000 tons for the month, not only a record for November, but fully up to high-water mark for any month. The biggest month in ore shipments ever made in Lake Superior was by that road during August this year, with 1,786,000 tons, and if November maintains its speed to the close it will scarcely fall behind. But no one anticipates that such a rate can be continued to the end of this month. The Mountain Iron mine had on Saturday six steam shovels loading ore, and the product was something tremendous. The Hibbing group was making an almost similar record, while other mines and districts of the Oliver Company were carrying on a similar business.

The Duluth & Iron Range road, which is a property of the United States Steel Corporation, has let contracts for the rebuilding of its No. 5 ore shipping dock, at Two Harbors. This dock will be no longer than now, that is 1112 ft., but its height from water to bottom of pockets, and from bottom of pockets to deck, will both be mate-

rially increased, giving it far greater capacity than now. It is another victim to the demands of vesselmen, who are steadily building bigger, deeper and wider ships, and for whose newer craft a dock only 30 ft. to the bottom of pockets is useless. This dock was 54 ft. high; it will be about 67 ft. The new pier will cost in the neighborhood of \$400,000.

A New Pace Has Been Set for Royalties.

not only on the Mesaba, but now in the Iron River region of the Menominee range. There this week the Brown land case was settled by the payment of certain sums to Brown, and the agreement of the parties in interest to lease the Brown lands to the Buffalo & Susquehanna Iron Company at a flat rate of 25 cents a ton. This tract lies between the Hiawatha, on which the same company has an option for lease, and the Dober of the Oliver Iron Mining Company. It is known to carry the Hiawatha lenses and is probably valuable. Explorations by the Buffalo & Susquehanna Iron Company people on the Hiawatha have been fairly successful, and the two will doubtless make a good mine. The district is one of ores ranging from 50 to 52 per cent. of iron, 0.25 phosphorus and from 5 to 7 silica—not high grade, but of good character. There is intense activity in this part of the Menominee range and many operators are working there at this time, some of whom are said to be finding ore bodies of large size and easy operation.

Republic Activity.

The Republic Iron & Steel Company, under its new management, is busily engaged in strengthening itself in ore reserves on the Mesaba range. It has good reserves in the South and in the class of ores found on parts of the Menominee range, that is low grade, silicious, partly Bessemer, but has been weak in Mesabas. It has taken a number of small properties there of late, the latest of which are a portion of section 24-58-17, and the northeast one-quarter of the northwest one-quarter of section 9-58-16. This latter joins the new Kellogg of the New York State Steel Company on the west, and is known to contain a body of good ore. The company is said to be investigating several properties on the Vermillion range with the view of exploration. On that range efforts are still under way looking toward the clearing up of titles of the Anderson, Lucky Boy and Camp properties in order that they may be developed. There is excellent surface showing at these old explorations, and an independent interest is arranging to explore on a thorough scale as soon as titles can be arranged. These properties lie close to the Ely mines, but if they prove mines will be on another and distinct ore lense. It is probable that this exploration, if finally undertaken, will be the most important piece of work to be done on that range the coming season.

It is very hard to interest capital in the Vermillion range on account of the few ore deposits that have been found and the cost of exploration. So far, though there has been exploration for the past 25 years, but two deposits have been discovered, those at Soudan and from Ely to section 30, and those were both found prior to 1887. The general feeling is that some time other ore lenses may be discovered, but operations at even the most promising of these various croppings have yet failed to reveal anything of exceptional value. It is stated that a shaft is to be sunk on section 29-63-11, east of Ely, where drill work conducted by Cole & MacDonald was discontinued some weeks ago. At this point a ledge of great width has been uncovered and shallow work has opened ore.

At the property of the White Iron Lake Iron Company in section 2-62-12, just south of Ely, the company has been drilling more or less continuously for several years, and is now sinking a shaft. One drill hole recently stopped at the depth of 1400 ft., and it is claimed the last 100 ft. was all ore running up to 62 per cent, and low in phosphorus, but as to the truth of this I have no knowledge. This company has been conducting operations at its own expense and is composed of many local people. The Biwabik Company's work on Pine Island, north of Vermillion Lake, is said to be looking well. Drill work and perhaps a shaft will be carried on here during the win-

ter. These operations are all that are under way in new developments on the Vermillion range, aside from that of the Midland Steel Company on section 30-63-11, where the shaft is going down and drifts are working out into the ore.

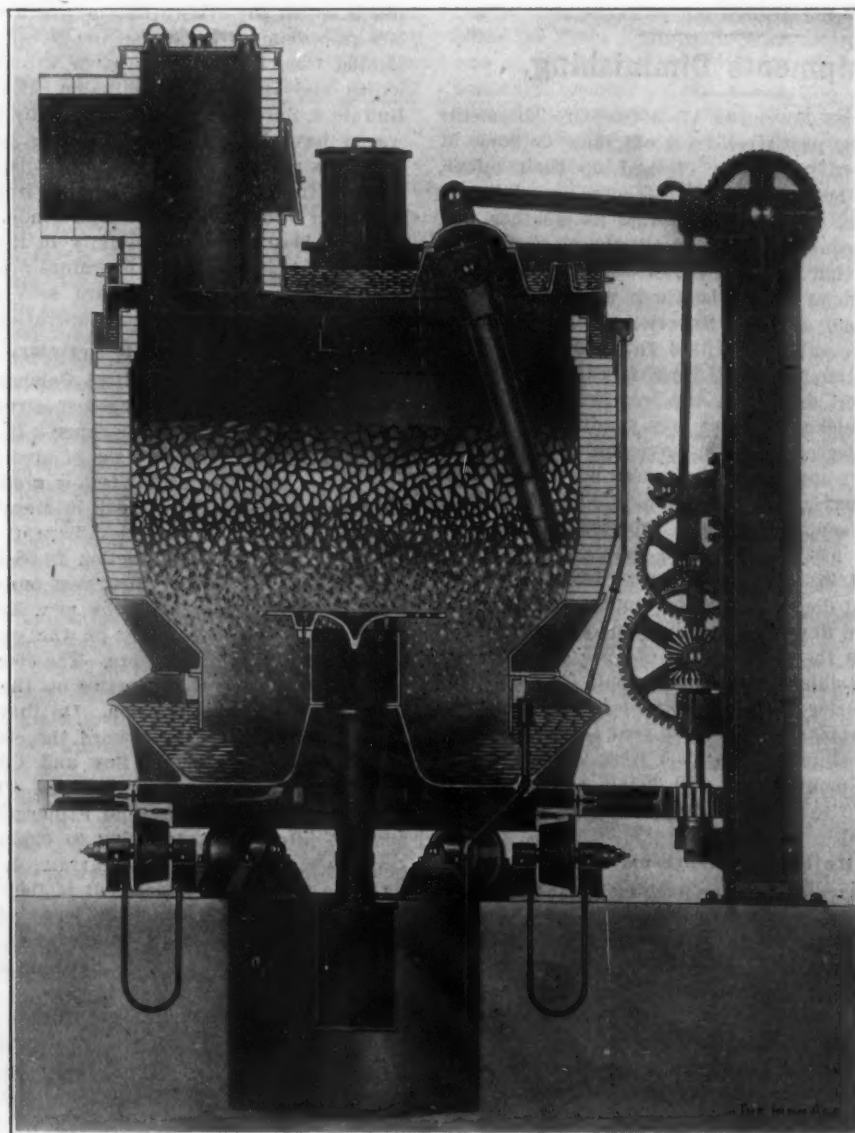
D. E. W.

The Hughes Gas Producer.

The accompanying engraving gives a sectional view of the Hughes patented mechanically poked continuous gas producer, which is manufactured exclusively by the Wellman-Seaver-Morgan Company, Cleveland, Ohio. The special feature of the producer is the mechanical poker,

capacity. Under average conditions the capacity of the mechanically poked producer is claimed to average 25 lb. per hour per square foot of producer area, and frequently 30 lb. per square foot may be gasified for long intervals. The nominal capacity for the Hughes mechanically poked continuous gas producer is one ton of coal per hour per producer, basing this estimate upon the standard size of producer, which is 10 ft. in diameter inside of the fire brick lining.

The main shaft and gearing are supported by steel framework securely braced to the top of the producer. The gearing is accessibly located for removing or repairing. The producer shell is of steel plate and is



Cross Section of the Hughes Mechanically Poked Continuous Gas Producer Built by the Wellman-Seaver-Morgan Company, Cleveland, Ohio.

which is a water cooled steel casting suspended from a trunnion. The poker is oscillated by an eccentric rod in connection with a ratchet wheel, which in turn is oscillated by a pawl connecting with a crank driven through a reduction of gearing from the main shaft. This mechanism moves the poker back and forth radially, agitating and breaking up the mass of coal while it is revolved bodily with the producer, and also assisting in distributing the coal and working down the ashes for removal. Thus, hand labor in poking is eliminated and the fuel is not subjected to the variations in treatment incidental to hand poking. The uniform treatment secured by the mechanical poker, it is stated, has proved especially beneficial, giving better and more uniform results as to the quality, quantity and supply of gas, and thus reducing the number of producing units and the size or number of buildings required for a given

secured to a cast iron base ring, to which is bolted a cast iron water seal forming an ash receptacle. The base rests upon a cast iron revolving turntable, which, as it turns, rotates with it the body of the producer and the ash pan.

The bottom of the turntable is fitted with a steel tread resting on conical rollers. As the producer shell revolves, the ashes work down and are deposited in the rotating water sealed ash pan, from which they may be shoveled directly to a car by a man standing at one side of the producer, no special machinery being required. The producer is arranged for the usual fire brick lining. The producer top is a steel casting flanged and ribbed to provide for water cooling, a water seal being formed by a top flange at the outer circumference of the producer cover. The use of a steel casting for this part adds materially to its durability, as experience has

demonstrated that steel castings withstand exposure to heat much better than cast iron and decrease the expense for repairs.

The producer top is equipped with two feed hoppers fitted with counterbalanced bells and water-tight swing covers. These hoppers are located at different distances from the circumference of the producer top and deposit the coal in concentric rings as the producer top revolves, thus facilitating the proper distribution of the material. To the top of the producer is attached the gas outlet, provided with cleaning door, peek holes, &c., and having a short flanged neck, to which a connection from the gas outlet to the gas flue may be made. The base of the producer has a gas inlet pipe, with a cast iron deflecting plate covering the air opening, as shown, and a suitable blower is furnished.

The quality of the gas produced by the mechanically-poked producer, using bituminous coal, has been found from repeated tests to be very uniform, many of these tests showing between 3 and 4 per cent. of CO₂, and from 26 to 28 per cent. of CO. It is claimed that an average uniform quality of gas can be maintained of the following composition by volume:

CO ₂	CO	Hydro-carbons.	H	N
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
4	26	3 to 4	13	53

The producers are usually driven by alternating or direct current electric motors, 3 hp. being sufficient to operate a single mechanically poked producer. The labor required depends somewhat upon the arrangement of the plant and the facilities for coal and ash handling. In plants where the coal is delivered overhead into bins and fed to the producer through a chute or by other mechanical device six men can ordinarily operate eight producers.

The Ontario Iron & Steel Company.

The Ontario Iron & Steel Company has under erection at Welland, Ontario, Canada, a steel plant and rolling mill for the manufacture of open hearth bars, angles and light rails. A steel casting department is also included for the manufacture of sections varying in weight from 1 lb. to 10 tons. The site covers 60 acres fronting on the Welland Canal, and direct connection with five railroads affords excellent transportation facilities. A dock will be built on the canal front, which will permit the company to handle its raw material economically by water. The Canadian Government is at present constructing a turning basin in the canal below the property of this company, which will permit large steamers from Lake Erie to discharge their cargoes and return again to the lake without entering the canal locks, the company's dock being at Lake Erie level.

Two 25-ton open hearth furnaces will comprise the steel producing equipment, the open hearth building being 85 x 175 ft. In the rolling mill building, which is 300 ft. long and 119 ft. wide, the equipment will consist of three-high 12 and 22 in. trains, which are being built by the Lewis Foundry & Machine Company, Pittsburgh. The mills will be electrically driven by a c. 2200-volt motors, which will be furnished by the Westinghouse Electric & Mfg. Company, Pittsburgh. The 22-in. train will be served by a continuous ingot furnace, and two heating furnaces will be provided for the 12-in. mill, the object being to make the operation of the mills as nearly continuous as possible. The foundry will be 150 x 165 ft. and will contain one 20-ton open hearth furnace.

The buildings will all be provided with electric traveling cranes, contracts for which have been awarded to the Niles-Bement-Pond Company, New York. The buildings will be of steel construction throughout and are being built by the Berlin Construction Company, Berlin, Conn. The electric power will be furnished by the Ontario Power Company, Niagara Falls, and natural gas will be used as fuel for the furnaces and will be furnished from the company's wells. The main office will be established in the Traders' Bank Building, Toronto, and officers and department heads have been chosen as follows: W. W. Near, president; H. Rooke, secretary;

Robert Porter, formerly connected with the Riverside department of the National Tube Company, Pittsburgh, works manager, and Daniel J. Blaney, foundry superintendent. The furnace construction is in charge of J. A. Herrick, New York, and W. J. Bradley, Troy, N. Y., has the rolling mill construction in hand. The first steel will be manufactured early in the spring, and it is expected that the plant will be in full operation about July, 1907.

An Elastic Currency Plan.

A currency plan has been adopted unanimously by the Monetary Commission of the American Bankers' Association and a committee of the New York Chamber of Commerce, who concluded their labors in Washington, D. C., November 15. The commission and committee were appointed by their respective bodies to consider the defects in the currency system of the United States, with a view to the suggestion of changes making the volume of the currency more responsive to the demands of commerce. At this conference a subcommittee composed of A. B. Hepburn of the Chase National Bank of New York, James B. Forgan of the First National Bank of Chicago, and J. L. Hamilton of Hoopestown, Ill., former president of the American Bankers' Association, was appointed to draft a bill to be presented to Congress embodying the following recommendations:

CREDIT BANK NOTES.

1. Any national bank having been actively doing business for one year and having a surplus fund equal to 20 per cent. of its capital shall have authority to issue credit notes as follows, subject to the rules and regulations to be determined by the Comptroller of the Currency.

(a) An amount equal to 40 per cent. of its bond-secured circulation, subject to a tax at the rate of 2½ per cent. per annum upon the average amount outstanding, provided that if at any time in the future the present proportion of the total outstanding unmatured United States bonds to the total capitalization of all going national banks shall diminish, then the authorized issue of credit notes shall be increased to a correspondingly greater percentage of its bond-secured notes.

(b) A further amount equal to 12½ per cent. of its capital, subject to a tax at the rate of 5 per cent. per annum upon the average amount outstanding in excess of the amount first mentioned.

The total of credit notes and bond-secured notes shall not exceed the capital.

RESERVES.

2. The same reserves shall be carried against credit notes as are now required by law to be carried against deposits.

GUARANTY FUND.

3. The taxes provided upon credit notes shall be paid in gold to the Treasurer of the United States, and shall constitute a guaranty fund for the redemption of notes of failed banks and for the payment of the expenses of the printing and the cost of redemption. In order that the guaranty fund may be ample from the beginning, any bank making application to take out credit notes for issue shall deposit with the Treasurer of the United States in gold an amount equal to 5 per cent. thereof. The unused portion of this initial payment shall be an asset of the contributing banks respectively, and shall be refunded from time to time when this may be done without reducing the guaranty fund below an amount equal to 5 per cent. of the credit notes taken out.

REDEMPTION.

4. The Comptroller of the Currency shall designate numerous redemption cities conveniently located in the various parts of the country. Through the agency of the banks in such cities adequate facilities shall be provided for active daily redemption of credit notes.

5. The provision of existing law limiting the retirement of bond-secured notes to \$3,000,000 per month shall be repealed.

6. All public moneys above a reasonable working balance, from whatever source derived, shall be currently deposited from day to day in national banks without requiring collateral security or special guaranty therefor, but in no case shall the balance carried with any bank exceed 50 per cent. of the capital thereof. All banks receiving such public moneys on deposit shall pay into the United States Treasury interest thereon at the rate of 2 per cent. per annum.

The recommendations are concurred in by Representative Charles N. Fowler, chairman of the Banking and Currency Committee of the House of Representatives, and it is stated that the plan is approved by the Comptroller of the Currency, who met with the commission. The Secretary of the Treasury has issued a statement that while he does not commit himself to the support of this particular measure he is in a general way in favor of any proposition which will assure elasticity in the currency.

The Manning Cylinder Drain Valve.

Draining the cylinders of noncondensing steam engines without unnecessary waste is important when the highest steam economy is sought. In some of the older rolling mills simple single slide valve engines are still in use and many of the slide valve type have single piston valves. These valves are invariably located either above or at one side of the cylinder, but never on the bottom,

cylinder, and even the slight slamming of these checks soon wears them out or breaks them.

To overcome the inherent bad qualities of this automatic valve H. G. Manning, East Liberty Station, Pittsburgh, Pa., has designed and applied for a patent on a valve which is practically a small slide valve, set in a separate casing at the side and below the bottom of the cylinder, the ordinary steam ports of this side valve being connected to each end of the cylinder and the exhaust

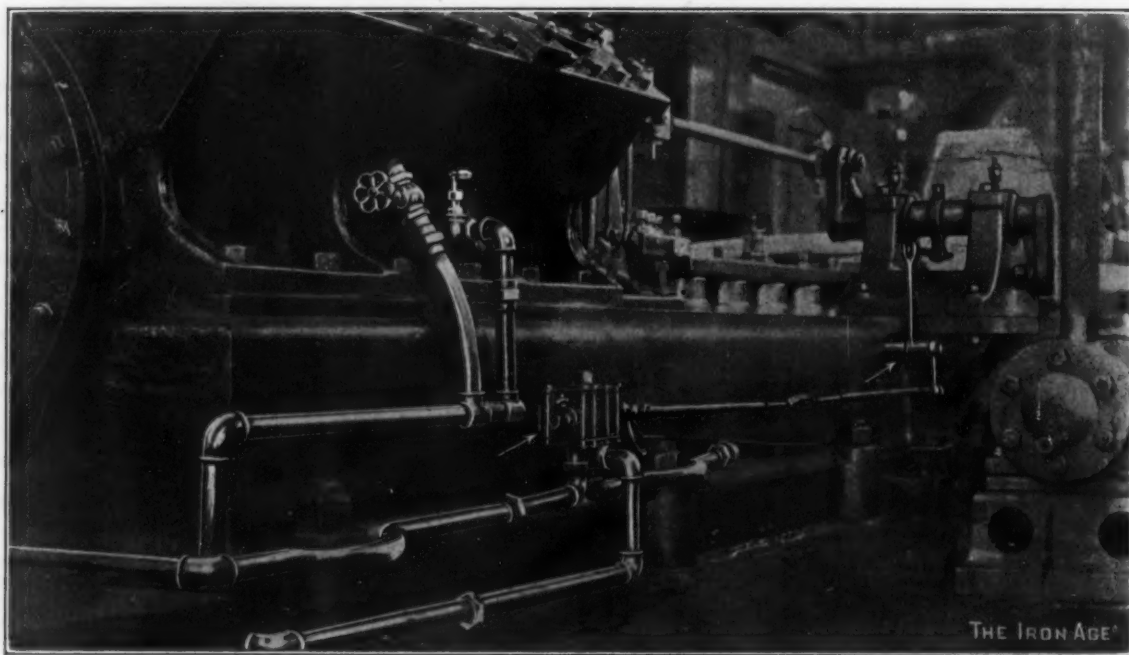


Fig. 1.—The Manning Cylinder Drain and Relief Valve Applied to a Rolling Mill Engine.

where the drainage from the cylinder would be ideal without the use of cylinder cocks. It is therefore imperative to place a drain cock on each end of the cylinder. The gradual extensions to these old plants in the majority of cases have resulted in long runs of steam piping from the boilers, and condensation finds its way to the cylinder in spite of separators, good pipe covering, &c., especially in rolling mill engines, where the load varies quickly from full load to no load. Under these conditions for safety's sake good cylinder drains must be provided, and often relief valves as well are placed in the cylinder heads. The engineman can hardly be blamed for erring on the safe side, so that the temptation is to leave the cylinder cocks open all the time, instead of only when the engine is started. This waste is apt to be neglected as long as the boilers can furnish the excess steam.

The amount of steam wasted without doing work by a 24 x 36 in. engine running 100 rev. per min. and developing, say, 650 hp., if the usual 1-in. drain cocks at each end of the cylinder are wide open, will amount to 3000 lb. of steam per hour, practically equivalent to 100 boiler horsepower in round numbers, or 15.4 per cent. of the full rating of the engine. With coal at \$3 a ton and a consumption of 4 lb. of coal per horsepower per hour, 7200 lb. of coal is wasted per running day of 18 hr., or in money value \$10.80. Multiply this by 20 engines of the above class and the loss becomes enormous.

These conditions existed at a certain plant and a correction was sought by using a cock which automatically closes the working end of the cylinder to the atmosphere and opens it on the exhaust stroke. It is arranged so that both ends can be held open when starting the engine, but the automatic feature is supposed to be put in action as soon as the engine is up to speed. When the valve works properly the saving is noticeable and its value demonstrated, but its disadvantage is that it depends on check valves operated by the pressure in the

port to the drain. The slide valve is driven from any convenient part of the engine valve motion, as indicated in Fig. 1, partaking of the movement of the eccentric, which causes it to open or close the drain ports at the proper times. The cylinder pressure is admitted to the under side of the valve, which is normally held to its seat by live steam pressure above it, but if a dash of water comes into the cylinder the valve can lift and automatically relieve itself. As shown in Fig. 2 a very small

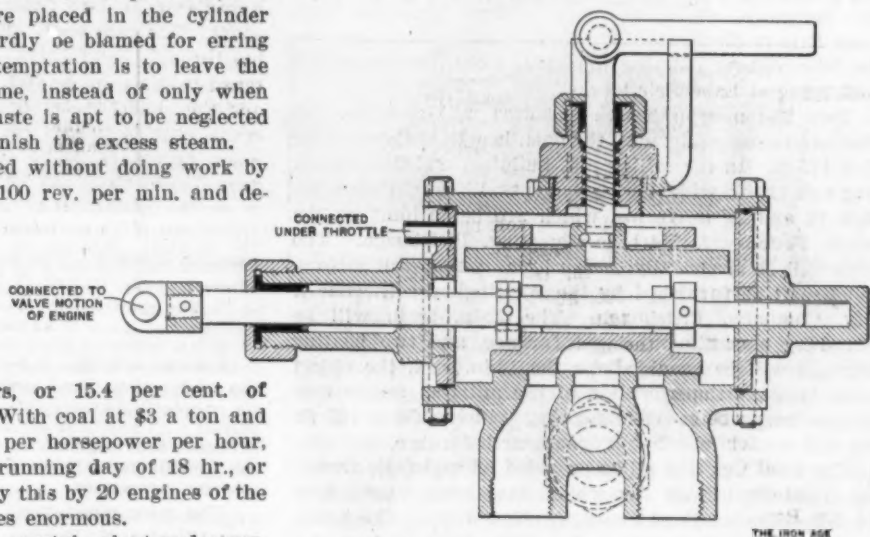


Fig. 2.—Cross Section of the Manning Cylinder Drain Valve.

opening into the auxiliary slide valve chest admits the steam to balance the valve and keep it to its seat. This is preferable to the use of a spring, which being subject to such a high temperature would be likely to break.

By unscrewing the stem in the top of the valve chest, the slide valve is lifted from its seat without interfering with its reciprocating motion, so that when the engine

is started both ends of the cylinder are afforded a full outlet. Without this provision the slide valve would be unnecessarily twisted and slammed in starting, but since the lifting device leaves a chance for the engineer to forget to drop the valve, in which condition it is useless, some of these drain cocks are constructed without the lifting device, making them wholly automatic. No trouble has been experienced with the first mentioned form except that of prompting the engineer to use it properly.

The advantages are a smooth and fixed motion to the operating valve, without slamming or anything of a shock which tends to rapid wear. It is automatic in its action, and when applied to engines of the class referred to is claimed to save from 8 to 15 per cent. of the steam required under the old way of running.

The Mogul Gasoline Engine.

A gasoline engine especially intended for use in suburban railroad cars, omnibuses, traction engines and boats is a new type built by the Four Wheel Drive Wagon

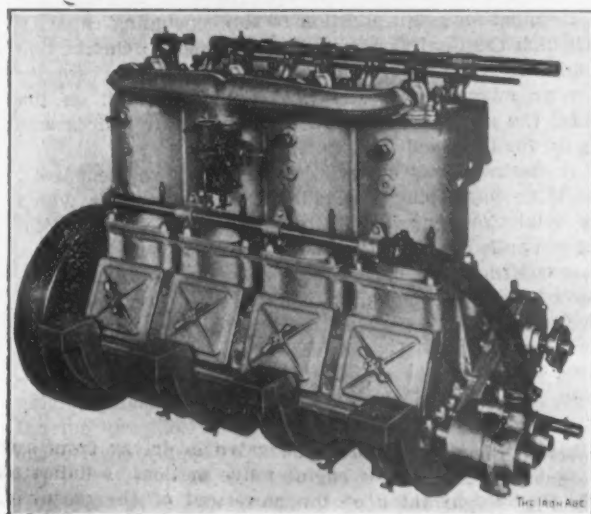


Fig. 1.—The Inlet Side of the Mogul Gasoline Engine Built by the Four Wheel Drive Wagon Company, Milwaukee, Wis.

Company, Milwaukee, Wis., and known as the Mogul. It is designed for constant hard service and heavy work, and is the same engine that is used in driving the pow-

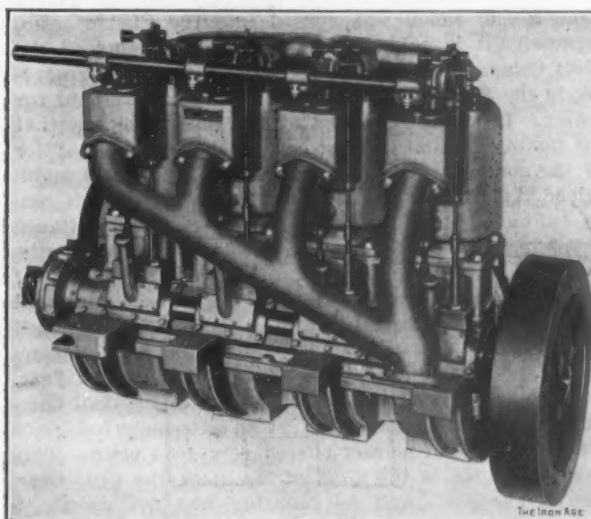


Fig. 2.—The Exhaust Side of the Mogul Gasoline Engine.

erful four-wheel drive motor truck which the company builds, differing from other types of engines particularly in its extra heavy crank shaft having five long bearings. The shaft is cut from one piece of steel and is then up-ended and flanged for the flywheel, making one solid piece.

The engine, of which Figs. 1 and 2 show the inlet and exhaust sides, operates on the four-cycle principle, has four 6 x 6 in. cylinders, is water cooled and develops 45 hp. at 750 rev. per min. The four cylinders, a cross section of one of which is shown in Fig. 3, are cast separately, with integral water jackets, through which a circulation is maintained by a rotary pump of large capacity, which is fitted to the engine. The pistons, like the cylinders, are made of gray iron castings, each having four eccentric rings, three above and one below the wrist pin, and are amply provided with oil grooves, in-

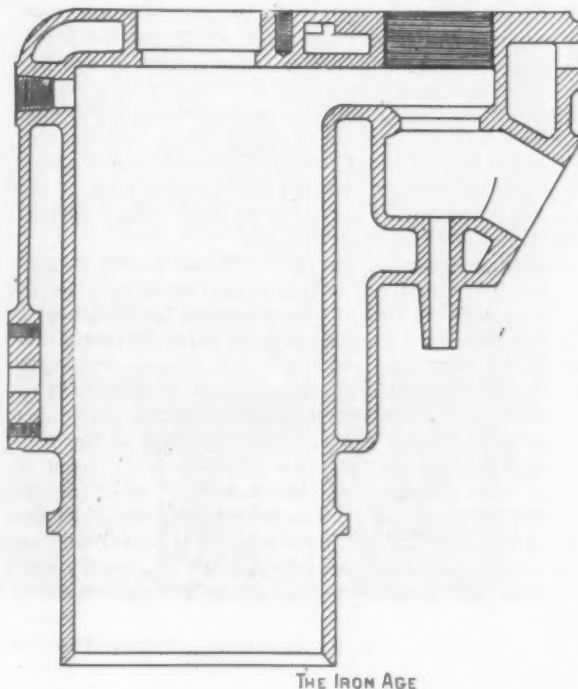


Fig. 3.—Cross Section of One of the Cylinders of the Mogul Gasoline Engine.

surging perfect lubrication. Aluminum is used for the crank case, which is divided into four compartments, insuring a supply of oil regardless of the position of the engine. Ignition is secured by a Remy magnet and the jump spark system. The circulating water is cooled in a radiator by two fans driven by belt from the crank shaft. The cam shaft and valve gear are easily accessible through hand holes. The hand hole plates are fastened in place by screws, which are readily removed. In addition another set of plates is arranged under the crank case to permit easy access to the connecting rod when necessary. The connecting rods are made from drop forged steel and have hardened sleeves where they fit on the piston pins. All bearings are extra long and are made of white brass metal, hand scraped to a true running surface. The inlet valves are mechanically operated in the center of the cylinder head and are made of high carbon steel.

We can officially state that press reports to the effect that the United States Steel Corporation would take over the Wheeling Steel & Iron Company, Wheeling, W. Va., and La Belle Iron Works, Steubenville, Ohio, are absolutely untrue, no such negotiations being under way. It is a fact, however, that the Wheeling Steel & Iron Company and La Belle Iron Works have each appointed committees which will meet within a short time to discuss a proposed consolidation of these two interests. Whether this will be done cannot be stated at this time, as the matter has not been officially presented to the stockholders of either concern.

The courts have appointed I. B. Torby of Marietta, Ohio, receiver for the United Sheet & Tin Plate Company, which has plants at Marietta, Newcomertown and Byesville, Ohio.

The Dominion Coal and Steel Companies Dispute.

TORONTO, November 17, 1906.—For a time the dispute between the Dominion Coal Company and the Dominion Iron & Steel Company threatened to bring about a suspension of operations at the latter company's works. Any long shutdown there would cause a vacuum in the domestic supply of rails and wire rods, and the importation of these would at once be stimulated, for there is a market awaiting every ton of the company's largest possible output for at least a full year. Rails for the Intercolonial and for the Quebec-La Toque section of the National Transcontinental line will be needed as fast as the Dominion Steel Company can go on delivering them, and, if for any reason, it could not supply them, the Government would have to send its orders outside the country. In the present rush of railroad construction time is the prime consideration. Cheapness, at least within certain limits, is not of so vital importance.

Some time ago when the Grand Trunk Pacific wanted rails which it could not obtain from Canadian mills at once it went to the United States market for 50,000 tons. It preferred to pay the considerable total difference between the import cost and the home price to waiting a few months. A complete and prolonged closing down of the Dominion Steel Company's works would mean, besides a dislocation of trade, the withdrawal of the sustenance of a large part of the population of the town of Sydney. The company had to bring in a colony of expert workers from the United States, and the additions made to these by training have swollen the total number of the company's employees into a large industrial force. These men would not long stand about, idle spectators of a war between the Coal and Steel companies. They would be under no necessity to do that, as a ready demand for their labor could be found across the line. Once away, there would be an almost insuperable difficulty in obtaining men to start up the works again in these times of labor shortage.

Hence the city of Sydney as a whole was concerned to prevent a shutdown. Its City Council and its Board of Trade were influences working for the restoration of harmony. Much more potent were the peacemaking services of the prominent men on both boards, such as Senator Cox, Senator Farget, Senator McKeen and Sir William Van Horne. Working in the same interest was the most powerful financial institution in the country, the Bank of Montreal, and it was seconded by the next strongest of the country's banks, the Canadian Bank of Commerce.

The Government Interested.

Nor could the Dominion Government look on indifferently. Both of the big companies engaged in the quarrel owe much of their prosperity to Government favor, the Coal Company having the benefit of a protective duty, and the Steel Company being fostered by protective duties and bounties. Moreover, that member of the Dominion Government who is looked upon as the author of the tariff, Finance Minister Fielding, is himself a Nova Scotian, and to him probably more than to any other public man is credit to be given for the inception of the industrial enterprise of which Sydney is now the center. It was under Mr. Fielding's régime as head of the Provincial Government of Nova Scotia that the Coal Company entered upon its career. From Premier Fielding's government H. M. Whitney and associates obtained their lease of the Provincial coal lands the Dominion Coal Company is now operating in Cape Breton Island.

When Mr. Whitney went to Ottawa to get a Dominion charter for his company he encountered political opposition. His bill was rejected. He had to be satisfied with a Provincial charter, which the Nova Scotia Legislature, under its leader of that day, Mr. Fielding, was not slow to grant. As a sort of foster father of the Coal Company the Canadian Finance Minister could not but regret that any trouble should arise between it and its offspring, the Steel Company. It is understood that his good offices were at the disposal of the parties, in so far as he could be serviceable to promote peace.

With so much at stake and with such influences at work it was almost a foregone conclusion that any stoppage of work that might be caused by the dispute would not be of long duration. And it so turned out. A complete settlement has not been effected, but a truce was reached which permits of the Steel Company getting into full operation again. The working arrangement agreed upon is that the Steel Company shall take coal from the Coal Company and pay for it the same price as other large consumers pay. This is to hold until the question of difference is judicially determined. If the Coal Company can meet the demand of the Steel Company the latter will have all its plant working up to the full capacity again.

The Contract.

These two corporations have been closely associated throughout their history. Both were brought into existence by H. M. Whitney, the Coal Company being the senior by some years. When the Steel Company was formed the Coal Company's market was rather limited, and the blast furnaces, open hearths and rolling mills the newer enterprise was to operate were looked upon in anticipation as an addition to the consuming capacity on which the Coal Company had to depend. On the one hand, the securing of a large and permanent customer was an advantage to the Coal Company, and, on the other, the assurance of a fuel supply at low prices was a gain for the Steel Company.

A contract was entered into by the two companies, the same men being predominant in both, under which the Coal Company was bound to keep the Steel Company supplied for 99 years with coal at a very low price. This contract held until it was ended by the amalgamation of the two companies, their common directors transferring the Coal Company to the Steel Company. This arrangement proved unsatisfactory, and almost exactly three years ago the union was dissolved, the Coal Company resuming its separate existence. Besides paying \$1,000,000 for its deliverance the Coal Company entered into another long-term agreement to supply coal to the Steel Company. The term was for 90 years. All the coal required by the Steel Company was to be furnished by the Coal Company. The price was to be \$1.24 per ton the first six years, and was to be fixed for 5-year periods thereafter by arbitrators. The coal was to come from the Phelan seam.

Cause of the Friction.

This contract appears to have been adhered to to the satisfaction of the Steel Company until quite recently. Of late, however, there has been friction. Dominion Mine No. 6, which was opened into the Phelan seam, expressly, it is said, to meet the requirements of the Steel Company, yields a grade of coal in which, according to the Steel Company, there is too much sulphur for coking. It was also alleged by the Steel Company that the quality of coal delivered was below that called for by the contract. On its part, the Coal Company maintained that it was living up to the contract. It is contended on behalf of the Coal Company that the continued supplying of selected coal for coke purposes at the specified price meant a loss of \$400,000 a year. Of course, as the magnitude of the steel works increased and its output enlarged, the quantity of coal consumed grew. From 1900 to 1906 the Steel Company coal requirements shot up from 400,000 to 800,000 tons a year.

Thus a constantly increasing volume of the Coal Company's output had to be sold at an extremely low price when the general market offered very good prices. This caused chagrin in the mind of Mr. Ross, the Coal Company's president, and he probably was not averse to putting an end to a contract which was regarded as a losing one. Technically his company probably fulfilled the contract by delivering Dominion No. 6 coal, which, though sulphurous, came from a section of the Phelan seam. But as it would not sell for so much in the open market as coal from Reserve or Dominion No. 2 mine, it was more profitable to send it to the Steel Company and sell the Dominion No. 2 and Reserve output to other customers who had no 90-year contract. This led to the breach, which, after much negotiation by many intermediaries, has been temporarily repaired. C. A. C. J.

Tin Plate in Canada.

TORONTO, November 17, 1906.—Though the Tariff Commission is supposed to have closed its inquiry and to have completed the bill that is to be presented to Parliament in the session that opens next week, representations on the subject of customs duties continue to be submitted to the chairman. A rather notable deputation was received by Mr. Fielding yesterday to urge the retention of tin plate on the free list. It was a committee of the Farmers' Association, introduced by John Tolmie, M. P., who was returned for North Bruce in the by-election held in that riding a few weeks ago. The fact that Mr. Tolmie is a supporter of the Government may be construed as favorable to the petition, coming as that does from an association that stands for the free trade sentiment of the country. Mr. Fielding's reply was, of course, noncommittal. He said that he would have to defer any statement of the Government's intentions on the matter until the introduction of his tariff bill.

A duty of 33 1-3 per cent. on tin plate has been advocated by the promoters of the tin plate works in process of construction at Morrisburg, Ont. Apparently in the confidence that protection would be conceded, the company went to large expenditure in the erection of buildings. What grounds it had for its confidence no one outside of the parties immediately concerned can say. It has been hinted that the organizer of the company was encouraged by the reception of his proposition at the hands of the Government, though nothing has ever been published to show that the Government stands committed to the idea of a tin plate duty. His project would naturally have the good will of the steel companies, from one or more of which would come the raw material for the Morrisburg Works. But it has at all times been actively opposed by the manufacturers of tinware.

The Opposition.

Strong representations against it were laid before the Tariff Commission at its London meeting and elsewhere, the tenor of such representations being that it would so enhance the cost of producing tinware in Canada as to put profits out of the question in the face of competition from abroad. To attempt to redress the matter by adding to the present 25 per cent. duty on tinware would not, it was argued, be satisfactory, for, though foreign tinware imports might thus be restricted, the greater burden of the price would depress the demand. It was to support this view that the deputation of farmers' representatives waited on the Finance Minister yesterday. In the memorandum of the petitioners it was pointed out that tin plate is the raw material of a large list of necessary articles used by farmers. Tin cans have to be used for milk, which, being rather destructible, have to be frequently renewed.

Enormous quantities of tin plate are worked up for the use of the canning industry, and as farmers are the growers of the fruits and vegetables thus preserved they would feel any addition to the cost of the tins in the form of a lessening in the price paid for the farm product, or, if this price were maintained, the effect would be felt in diminished consumptive demand for canned fruits and vegetables.

At hearing of the commission when it was touring the country arguments of like cogency had been presented by the lobster cannery of Nova Scotia and by the salmon cannery of British Columbia.

According to the unrevised returns of the Canadian Customs Department the imports of tin plate and sheets in the fiscal year ending with last June amounted to 605,182 cwt., valued at \$1,860,000. Of this 350,307 cwt. came from Great Britain, and 254,740 cwt. from the United States. The values were divided between these two countries, as follows: \$1,134,492 for Great Britain and \$733,167 for the United States.

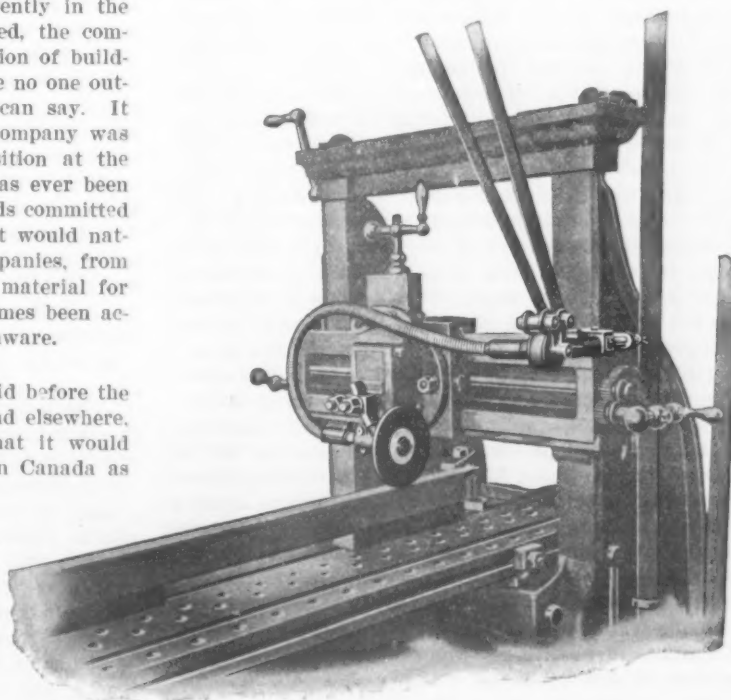
C. A. C. J.

At the monthly meeting of the Milwaukee Society of Engineers, held November 14, Prof. Storm Bull of the University of Wisconsin, read an illustrated paper on

"Recent Progress in Steam Turbine Construction." James Lyman, manager of the turbine department of the General Electric Company, Chicago, and Robert A. McKee of the Allis-Chalmers Company, led in the discussion which followed.

The Coates Surface Grinding Planer Attachment.

There are many shops not equipped with surface grinders capable of grinding work of any length, and it is to fill this need that the planer attachment seen in the illustration is put on the market by the Coates Clipper Company, Worcester, Mass. As will be noted, the standard lathe grinding outfit manufactured by the company, with flexible shaft drive, has been adapted for the purpose. The pulley head is clamped to the cross rail, while the grinding head is carried in the tool post of the planer head. The drive is through a 1-in. belt, idlers being arranged to give a good gripping contact on the driving pulley. The abrasive wheel, running at very high speed,



The Surface Grinding Attachment Made by the Coates Clipper Company, Worcester, Mass., as Applied to a Planer.

will grind any work within the capacity of a planer, and is fed across the work in the same manner as is a cutting tool.

The Norton Grinding Company, Worcester, Mass., has received a report on its new car wheel grinder, which was described in detail in *The Iron Age* of September 27, from the railroad company which is employing it in its shops. The machine is grinding 22 pairs of rough chilled car wheels daily, the error from perfect roundness being only one or two thousandths of an inch. The wheels so produced have been given practical tests in rolling stock, and it has been found that a certain vibration of cars which had been attributed to car springs is entirely absent, cars running perfectly true without jar. The theory is that car wheels ground precisely will have much longer life, being much less liable to develop flat spots than wheels which are less truly round.

The National Civic Federation will hold its annual meeting at the Park Avenue Hotel, New York, December 12 and 13. Among the subjects to be discussed are the injunction issue now so stoutly contested between employers and employees, and the menace of child labor in mines and manufacturing establishments. Andrew Carnegie, Oscar S. Straus and Alfred Mosely of England are among the speakers.

Brittleness in Steel.*

Observations Made in English Boiler Plate Practice.

BY C. E. STROMEYER.

The past year or two the confidence placed by the engineering world in mild steel has been shaken by a few failures for which as yet no satisfactory explanations have been found; but inquiries have been set on foot, of which it is hoped that if they do not throw any light on the true cause they may at least point to some test which will discover the doubtful material before it gets into the hands of the boiler maker.

Failures of Mild Open Hearth Steel in Early Days.

When at the end of the seventies, mild qualities of steel were first made in the open hearth furnaces, it was hoped that a more reliable substitute had been found for iron than Bessemer steel could claim to be; and after a short experience, especially on war vessels, the French and English Admiralties, followed by Lloyd's Register, fixed on certain quality tests which, so it was hoped, would discriminate between reliable and unreliable steel, or rather between open hearth and converter steel. In those days the chief cause of unreliability was believed to be the unequal distribution of carbon in Bessemer steel, and the most effective conditions for excluding this steel were that the material should have a high tenacity, say 25 tons and upward; a good elongation, say above 20 per cent., and the material should show no sign of brittleness after being heated to a bright red heat and plunged into water of 28 degrees C. or 82 degrees F. By this means the use of the somewhat uncertain Bessemer steel was practically stopped for ship and boiler plates; but in spite of careful testing, iron never having been tested to the same extent, alarming failures were still experienced. The best known of these was the breaking of the shell plates of the boilers intended for the Imperial Russian yacht *Livadia*. It will be remembered that after some of her boilers had been built one of them burst while being tested, and others were found to be fractured before testing, and these plates, which had stood the workshop practice, broke while being taken to pieces. The nature of the process by which the steel was made was not divulged, but that it led to irregular distribution of constituents was evident from a series of analyses, of which one set was made on the different layers of one sample, $\frac{1}{8}$ in. thick. The carbon ranged from 0.09 to 0.20; the sulphur from 0.018 to 0.123; the phosphorus from 0.039 to 0.079, and the manganese from 0.230 to 0.410.

In another sample, whose fracture showed very marked segregations, the carbon varied from a trace on one side to 0.050, 0.070 and 0.100 on the other side.

The tensile tests of the fractured plates varied from 29 $\frac{1}{4}$ tons to 34 $\frac{1}{4}$ tons tenacity, and elongations of from 11 $\frac{1}{4}$ to 23.9 per cent. in 8 in., except that some samples cut out between the punched rivet holes were quite brittle.

Failure of Marine Boilers After Two and One-Half Years' Use.

Shortly after this failure Mr. Maginnis published details about the failure of some other marine boilers which had been at work for two and one-half years. He says.

"1. The material used for two different sets of boilers, each set consisting of three circular boilers with horizontal steam chests, passed all tests required by the Board of Trade and Lloyd's. 2. The material stood without the slightest defect the ordinary work of the boiler shop, including welding, &c. 3. Each set of boilers worked satisfactorily at sea for a period of two and one-half years, after which they then exhibited signs that a complete change had taken place in the nature of the steel.

"Apparently the boiler plates had become absolutely brittle. The tenacities of the original plates varied from

26 $\frac{1}{4}$ tons to 30 $\frac{1}{4}$ tons, with elongations of from 19 $\frac{1}{4}$ per cent. to 27 per cent. The tensile tests of plates cut from the fractured combustion chambers, of which only two original tests are included in the above, showed tenacities of 25 tons, 26 tons and 45 tons, with elongations up to 27 per cent. for the first two, and up to 15 per cent. for the hard plate."

When about the time of these failures I discovered that mild steel could be made permanently brittle by merely heating it to a temperature of melting lead and bending and hammering it, hopes were entertained that similar failures could now be explained, but there are evidently other causes than working steel at a blue heat which will produce brittleness, and one which was very early recognized was the presence of phosphorus in the steel in excess of, say, 0.07 per cent.

A notable case of three ships being built of this quality of steel soon drew renewed attention to the danger of using it. Two of these ships were launched and went to sea; but fractures of their beams and angle irons were so frequent that an inquiry was made into the condition of the third ship, which was still on the stocks. It was found that nearly every frame and beam could be broken by heavy blows of a hammer, and that, too, in spite of the fact that these parts had shown no signs of brittleness when new, lending themselves to bending, punching, drilling, hammering and riveting operations without either breaking or cracking. This steel had been made by the basic Bessemer converter.

It is well known that elastic sulphur will, after a time, change into a brittle crystalline form, and in Sheffield the opinion is almost universally held that the steel made there improves by years of keeping. Why should not other qualities change and perhaps deteriorate? At any rate, my subsequent experiences have tended strongly to confirm this view.

Heat Treatment.

The general opinion is that brittleness due to heat treatment can be removed by renewed judicious heating, especially if accompanied by hammering or rolling, from which it would follow that the last heating process to which a piece of steel is subjected would have an all-important effect. Others seem to hold that every heat treatment through which a piece of steel passes leaves its mark. According to this view the temperature at which a charge is cast should influence its qualities. This is in a measure confirmed by differences of tenacity of steels of the same chemical composition, but made at different works, and also by the great difference of quality between the purest wrought iron and the purest steels. The former material has never been heated above a welding temperature; the latter has been in a molten condition. If this view is correct then even the temperature of the furnace used for reheating before rolling should affect the quality of the finished article. This may have been the cause of a recent failure of another plate.

It had been satisfactorily tested at the steel works, and being intended for butt straps it was being sheared again at the boiler works, when to the surprise of everybody these strips broke and fell off in bits. All the plates from the same cast were at once rejected, but no tests to which they were then subjected, nor yet the chemical analysis, revealed anything wrong.

The defective plate behaved very unreasonably. As already mentioned, the strips which were sheared off in the boiler yard fell to pieces, but those sheared off subsequently at the steel works were perfectly ductile and could be bent as close as any other samples. These latter samples had been sheared off the same end as the rest and the shearing edge was comparatively new. When strips were sheared off the other edges, which had not been touched since the plates left the steel works, were also found to be brittle. Evidently, then, the injury done to the extreme edge by shearing was slowly spreading into this plate, but the shears were not to blame, for the other plates were good. There was evidently something in the quality of this steel which made it sensitive to this severe treatment, and unquestionably therefore it was not a suitable material to use, but how it acquired this peculiar quality was not discovered.

* Annual report for 1905 to the Manchester Steam Users' Association, Manchester, England.

In view of the possibility of these occurrences this association may be congratulated on its system of check testing, which seems to be specially adapted for detecting changes which may be slowly progressing. When a boiler is being built under our inspection check tests are made with samples cut from certain plates, and these should, of course, reveal whether the material has grown brittle since it left the steel works. Check tests applied to the plates of Maginnis's boilers, or to the angles of the brittle ships previously referred to, would, it is fairly safe to say, have revealed that a change for the worse was taking place.

Time Effect on Steel.

A case of great interest, but one about which full details cannot unfortunately be obtained, occurred about two years ago in Russia. Some Lancashire boilers had been at work for six years, and were annually tested by hydraulic pressure in accordance with Government regulations. On the occasion of the sixth test one boiler burst, and one year later the adjoining boiler burst.

Although the material was not of first class quality one would hardly expect brittleness with a percentage of 0.121 per cent. carbon and 0.07 per cent. phosphorus; on the contrary, the analysis would lead one to expect the results which were actually obtained, namely, mean tenacity 23 tons, elongation 28 per cent. in 8 in.

Another class of fractures which may possibly be influenced by the chemical composition of the material and by improper heat treatment is caused by excessive and repeated straining, generally called fatigue. Plates which have been flanged round their edges and laid aside sometimes crack when the circumferences have cooled. Thick forgings sometimes crack while being machined, and an armor plate once broke in two, evidently due to a similar cause. These, or somewhat similar results, are produced in boiler end plates and furnace flanges due to excessive heating of the furnace plates, brought about in most cases by grease in the feed and sometimes by scale. This trouble was not serious as long as boiler pressures were low and boiler plates thin and elastic, but the increased pressures demand increased strength, which, if the design is not altered, is accompanied by increased rigidity and liability to fracture.

Corrugated Flues and Furnaces.

A careful inquiry into our past records as to the behavior of Lancashire boilers with corrugated flues and furnaces was made, and it was found that however bad was the treatment to which these had been subjected, no grooving had occurred, but crackings of the corrugations near the firebars were not infrequent. It was, therefore, deemed advisable to retain the plain rings for the furnaces, and to insert corrugated rings at the back ends of the flues. Inquiries revealed that whereas in Germany there is no difference in the price of boilers if fitted with flanged or corrugated furnaces and flues, in this country the extra cost of corrugated flues extending the whole length of a boiler would be from £150 to £250. It was therefore necessary to ascertain what would be the minimum length of corrugated flues of which good results might be expected. Fortunately, H. v. Knaudt, the manufacturer of corrugated flues in Germany, had made several experiments on the longitudinal elasticity of variously shaped flues, and since then Professor Bach and the Leeds Forge Company have made other experiments.

Except in the case of Professor Bach's experiments, for which very detailed figures are at hand, the values were obtained from measurements of diagrams. They were all reduced to a uniform standard of a plate $\frac{1}{2}$ in. thick.

At first sight it would appear that there is nothing to choose between flanged and corrugated furnaces, the contraction being about equal, say 0.0185 in. per pitch, but the pitch of the flanges is 32 in., while that of the corrugations is only 5.93 in., so that the latter are $5\frac{1}{2}$ times more elastic than the former. The elasticity is greatly influenced by depth of corrugation, as is evident on comparing the various Fox's sections and Holmes' bulb section, which are practically corrugations of 6 in. pitch with 18 in. flats between.

	V. Inch.	I, III, IV. Inches.	II. Inches.	VI. Inches.
Depth of corrugation.....	0.98	1.73-1.92	2.25	3.46
Compression per ton on 1 in. of circumference.....	0.00294	0.0146	0.0183	0.106
Compression at limit.....	0.0076	0.0183	0.0218	0.067

Experiments I, II, III, IV, V = Fox's corrugation. Experiment VI = Holmes' single bulbs.

These results are not in perfect harmony, but they indicate that the elasticity is approximately proportional to the cube of the depth of the corrugations, and the maximum permissible compression is proportional to the square of their depths.

Elasticity of Boilers.

The next question to be settled was the amount of change of form of boilers for which elasticity had to be provided. The effect of putting a circumferential tension stress on a boiler shell and a circumferential compression on the furnace tubes is to shorten the one and lengthen the other, the difference on 30 ft. being about 1-16 in. When a furnace plate is covered with thick scale or with grease it may, if the fire is intense, attain a temperature at which lead, and even zinc, will melt, say, 360 degrees F. hotter than the temperature of the steam, to which alone the shell plate is exposed. This excess temperature may be active over 15 ft. of the furnace, and will produce an elongation of $\frac{3}{8}$ in. If, therefore, the end plates of a boiler were to be made absolutely rigid one would require furnaces which would contract 7-16 in. without injury. If their plates were $\frac{1}{2}$ in.

thick there would have to be $\frac{0.437}{0.0185} = 24$ corrugations, or, say, 12 ft. length of corrugated flue. If the plates were $\frac{3}{4}$ in. thick there need be only 10 corrugations, having a total length of 5 ft. Some allowance has, of course, to be made for the 8 or 10 flanged rings and the elasticity of the end plates, but against this one has to take into account the gradual lengthening of furnace flues, which after a few years' working may exceed $\frac{1}{4}$ in.

After duly considering all the above mentioned influences, the lengths of corrugated flues which would give the desired relief were adopted, and now, after six years' working, no grooving or front end plate leakings of these boilers nor cracks in the furnaces have been reported, and that in spite of these boilers being worked hard and fed with greasy water, conditions under which ordinary high pressure Lancashire boilers would have developed grooves before the end of the third year. The working pressures are 180 and 200 lb.

Recently much has been said about the advantages of boilers with dished ends, and the great preference which they enjoy on the Continent, and the question is asked, Why they are not adopted in England? The answer is that it is a question of relative cost. Dished end plates can be made cheaper than flat end plates with their shell angle rings and gusset stays and appeal to all who dislike a multiplicity of parts. In Germany, as there is no difference in cost between flanged and corrugated flues, the latter are naturally fitted, for experience has shown that boilers with dished ends are too rigid longitudinally if fitted with plain flues. In England, where corrugated flues are at present so much dearer than plain ones that the difference in cost would outweigh the saving which might be expected from the substitution of dished ends, it must seem desirable to determine the minimum permissible length of corrugated flues, and the above considerations will, it is hoped, be of some assistance in fixing on the right dimensions.

The Erie Railroad Company has ordered from the American Locomotive Company three of the largest railroad engines ever built. These locomotives are of the Mallet articulated compound type. Each will have 16 driving wheels, which bear all the weight of the engine, thereby securing the advantage of every pound of the 410,000 lb. weight. The boiler is over 8 ft. in diameter at its largest part and contains $2\frac{1}{4}$ -in. tubes to the number of 468. The tender carries 8500 gal. of water and 16 tons of anthracite coal. These locomotives will be used as pushers on the grade east of Susquehanna, Pa.

The Citizens' Industrial Association will hold its fourth annual convention at Chicago, December 3 and 4.

The Commonwealth Steel Company.

Clarence H. Howard, president of the Commonwealth Steel Company, Granite City, Ill., has purchased the controlling interest in the company which was formerly held by the American Steel Foundries, and it will hereafter be operated independently. At a meeting of the stockholders immediately following the directors' meeting of the American Steel Foundries, November 2, when the transaction was consummated, the following were elected directors of the Commonwealth Steel Company: Thomas K. Niedringhaus, Clarence H. Howard, Harry M. Pflager, George K. Hoblitzelle, Arthur T. Morey, George E. Howard and John R. Turner. On the following Monday the directors met and elected the following officers: Clarence H. Howard, president; Thomas K. Niedringhaus, vice-president; Harry M. Pflager, vice-president; George K. Hoblitzelle, vice-president and treasurer; Frank L. Morey, secretary and auditor; George E. Howard, vice-president and sales agent; Arthur T. Morey, assistant to the president and general attorney. The president appointed W. E. Hoblitzelle general manager of the company, and the following appointments were also made: Chas. T. Westlake, chief mechanical engineer; C. F. Frede, mechanical engineer; R. A. Bull, general superintendent. The plant has a capacity of about 3000 tons per month.

A Notable Steel Tube Shipment.

The accompanying illustration shows a rather remarkable order recently filled by the National Tube Company



A Carload of 2-In. Steel Tubes 40 Ft. Long Made by the National Tube Company.

and loaded on a car ready for shipping. It is the first carload ever shipped of 2-in. steel pipe in 40-ft. lengths, and this is the first time probably that tubing of that size has ever been made in such great lengths. The shipment was made October 10, 1906, by the National Department, National Tube Company, McKeesport, Pa. The carload comprises 250 lengths of the pipe, or nearly 2 miles in all—10,000 linear feet, to be accurate.

The monthly meeting of the New England Foundrymen's Association was held at the Exchange Club, Boston, November 14. President W. B. Snow was in the chair. The committee appointed to act on the death of Edgar B. Pierce of the Wheeler Foundry Company, Worcester, submitted resolutions, which were accepted. The speaker of the evening was Dr. Richard Moldenke, Watchung, N. J., who gave an interesting talk on malleable cast iron. The usual dinner was enjoyed.

Immigration this year is exceeding anything ever before known in the history of the country. In the six months ending October 31, 1906, the number of arrivals from all countries was 632,137. The movement hither from Russia is particularly heavy, arrivals from that country in the period named having been 142,740.

Customs Decisions.

An Appraisement Question.

In a decision by Judge Hay, the Board of United States General Appraisers handed down a ruling, November 17, that is of general interest to importers. In denying claims filed by Larini, Cavallaro & Co., New York, the principle is enunciated that where an appraiser adds to the invoice value of merchandise it is sufficient to notify the importer that certain items upon his invoice have been advanced without specifically naming all of the items. In overruling the contention of the importers, Judge Hay has this to say:

"An importer is entitled to a notice of any advance in his merchandise made by an appraising officer, and failure to give this notice renders the appraisement inconclusive. It is not necessary, however, that this notice should specify each item upon the invoice, but it is sufficient if it conveys to the importer the information that certain items upon his invoice have been advanced without specifically naming all of them, and such notice puts him upon inquiry. His failure to examine his invoice carefully and to present his case fully to the General Appraiser or a board of three general appraisers, if he takes an appeal, is at his own peril and does not invalidate a liquidation made upon the final appraisement."

Duty on Manganese Ore.

An error made by the Collector of Customs at Philadelphia in the assessment of duty on an importation of manganese ore was corrected by the Board of Appraisers November 17. It appears that Matthew Addy & Co.,

Philadelphia, claimed the product to be free of duty, whereas the appraising officials returned the ore for duty on the basis of 10 per cent., the rate applicable to maniferous iron ore. The collector reported to the Board of Appraisers that the officials had made a mistake in the return and stood ready to grant a reliquidation of the entries.

Automobile Duties.

Importers of automobiles and their parts continue to have difficulties with the customs officials at New York regarding the values at which the articles shall be admitted. Motor wagons and motor omnibuses from Adolph Saur of Arbon, received at the New York Custom House, were deemed undervalued by the appraiser, whose action upon appeal by the importer is affirmed by the Board of Appraisers. Parts of automobiles shipped to this country by O. H. Jones and the Ste. Industrielle des Telephones, Paris, and Malicet & Blin, Aubervilliers, have been under investigation, with the result that, in many instances, higher invoice prices have been placed on the merchandise.

The B. F. Sturtevant Company, Hyde Park, Mass., has sold for export to Japan 10 of its specially designed propeller ventilating fans.

Cananea Copper Developments.

CANANEA, SONORA, Mexico, November 10, 1906.—The new Cananea Central Mining Company of the Thos. F. Cole group, at Cananea, Sonora, Mexico, is producing from development operations alone about 30 tons a day of 14 to 16 per cent. copper sulphide ore, which is being treated at the Greene smelters, and about the same tonnage of a 5 to 6 per cent. ore, which is being put on dump in anticipation of concentration later. From the smelting ore this new company is earning a profit, above all development and exploration costs, of about \$30,000 per month. No development has yet proceeded below the 100-ft. level, but on that and the 50-ft. level every opening is in ore. The ore bearing formation is a fissure vein crossed by a flat vein, the latter running at about the surface contour and pitching to the southeast. It has been cut several hundred feet away from where developments have opened it on the Bonanza shaft, and carries nearly equivalent values at all points where it has been tested.

The mineralization continues out from the walls of the main fissure veins through enrichment of the porphyry for a distance of several hundred feet, and at the present price of copper the valuable portion of the Bonanza vein is from 300 to 400 ft. wide. Eight shallow shafts, or test pits, have been sunk, and several thousand feet of drifting on the 50 and 100 ft. levels driven, and practically every foot of this is in ore. The company is yet undecided as to future operations, but will probably mine by the caving system, though it is not impossible that open cut mining will be conducted, and this would seem practicable for some of the deposits opened. In addition to that part of the ground which has been opened is the Massey No. 2, formerly owned by the Cananea (Greene) Consolidated Copper Company, and which seems to promise as rich a future as anything in the Cananea camp. It may be years before this is opened, as the company has a great stretch of ground aside from it.

The company has made no permanent arrangements looking toward anything more than a temporary handling of its ores by the reduction works of the Cananea Consolidated Copper Company, but action of the directors on this matter is expected shortly. Until action is taken nothing can be predicted as to the immediate future of the company as a copper producer. It is generally supposed that a large concentrator will be built to handle lean ores of the present workings and of other parts of the property where large bodies of excellent concentrating ores have been shown. Smelting may be done at the works of the Cananea Consolidated or at Douglas or El Paso, at each of which places is large smelting capacity.

Almost immediately adjoining Cananea Central on the south is another Duluth owned company, the Calumet & Sonora. Its ground is near the Massey No. 2 portion of Cananea Central. It carries somewhat similar iron dykes, has copper stains exposed on the diorite ledges of the wash and has found copper in the shaft. It is being developed and a contract for sinking 300 ft. is now in progress. The property of this company is surrounded on two sides by the South Cananea, which belongs to a company of which Robert Mitchell, of La Dicha Guerrero fame and former manager of the Cananea Consolidated is president and chief owner. It is sinking a shaft close to the Calumet & Sonora on the east and has projected another to be close by on the south.

All these properties are extending the limits of developed ground at Cananea in a most remarkable way, and the camp seems to have a far greater possibility than was dreamed of a few months ago. From the Puertocitos mine of the Greene to the South Cananea of Mitchell is about 13 miles along the general strike of the formation, and it is very evident there is mineral bearing ground much of the way. Few copper camps present such an area of possible mineralization and it is no wonder that Cananea is now attracting widespread interest and attention.

D. E. W.

The Philadelphia & Reading Coal & Iron Company has begun to replace the timbering in its mine shafts with cement. It has already cemented the sides of its Bear Valley shaft.

The Proposed Lake-Gulf Ship Channel.

To promote the improvement of inland waterways the Lakes-to-the-Gulf Deep Waterways Association has been organized. Nearly 1200 delegates attended a two-day session held in St. Louis on Thursday and Friday, November 15 and 16, and in an address to the public prepared by the Committee on Resolutions, and which was unanimously adopted, the principles for which the organization stands were set forth and are in part as follows:

The time has arrived for a generous expansion of our national policy toward all works of internal improvement which heretofore have occupied such a subordinate place in national expenditure; especially in comparison with the great sums that have been appropriated in recent years for army and navy purposes.

The proposed deep waterway is to extend from the Chicago drainage canal through the valleys of the Desplaines and Illinois rivers to the Mississippi River at Grafton, Ill., and thence down the Mississippi to St. Louis, and is to have a minimum depth of 14 ft. throughout. We recommend that for the purpose of meeting the probable future needs of navigation the minimum depth over the miter sills of the locks should be 21 ft. in the initial construction.

The excessive cost of the project, as shown by the engineers' estimates, was due mainly to the existence of the prominent barrier between the Great Lakes and the Mississippi Valley. This chief obstacle to the prosecution of this project has been removed by the drainage canal.

According to the estimates based upon recent surveys by the United States engineers, the work remaining to be done to complete the deep waterway channel to St. Louis will cost \$31,000,000.

Having considered the deep waterway enterprise from Chicago to St. Louis it now remains to deal with the subject of its further projection southward to the Gulf of Mexico.

In conjunction with the prosecution of the deep water enterprise from St. Louis northward it becomes at once a matter of grave importance that adequate provision should be made by Congress for the application of work of such substantial character to the lower river as to give fixedness to the channel and stability to the caving banks, accomplishment of which is the necessary basis of any plan for a permanent improvement and deepening of that part of the river.

Resolutions were adopted protesting against any treaty with Canada by which the amount of water to be taken from Lake Michigan for the use of the drainage canal shall be limited, and the first meeting of the Board of Governors of the association was called for December 6 at Washington, D. C. Officers were elected as follows: President, W. K. Cavanaugh, St. Louis; vice-presidents, David R. Forgan, Chicago, N. J. Sanders, New Orleans, S. M. Neely, Memphis, J. L. Hebron, Mississippi, Green Quarels, Arkansas; secretary, W. F. Saunders, St. Louis; treasurer, George H. Monroe, Joliet, Ill.; sergeant-at-arms, Thomas E. Hunter, Chicago.

Work of constructing the Belmont tunnel under the East River, from New York to Long Island City, has been carried on so quietly that the progress the company was making was not generally known until last week, when it was announced that the tunnel was rapidly approaching completion. The tunnel, which is being built by the New York & Long Island Tunnel Company, is to consist of two tubes, extending from a point in the vicinity of the Grand Central Station to the East River, under the river to Man o' War's Reef, and thence to Long Island City. The permission to sink a shaft on the reef gave the company the opportunity to start boring from four different points. So fast has construction work gone on that it is expected that the bore will be completed by January 1, and that before the end of next summer trains will be running through the tubes. As it is considerably less than a year since actual work was started a record in tunnel construction is said to have been established.

The new Japanese battleship Satsuma, designed and built by Japanese, was successfully launched November 15 at Yokosuka, in the presence of the Emperor. The keel was laid on May 15 of last year. The vessel has a length of 482 ft. and beam 83½ ft. Its draft is 27½ ft. Its tonnage, which is 19,200, exceeds that of England's biggest battleship, the Dreadnought, by 200 tons. Its horsepower, it is said, will be 18,000. Its speed will be 20¼ knots. The armament will consist of four 12-in. guns, 10 10-in. and 12 120 mm. guns. The Japanese naval architects have utilized in the construction of the Satsuma the valuable lessons learned in the late war.

chinery, excepting for delivery a long way ahead. Certain necessary, probably indispensable, features of a complete, economical equipment could not be had for a year at least. It is no simple matter to get together an efficient force of workmen, such is the condition of the labor market. But let us suppose that an industry now being projected will be established in 12 months, ready to do business, and that general business conditions will be the same then as now, which appears to be quite probable. The new industry would make its start when its goods could be sold, and there would be satisfactory margins of profit.

Granting all this, there is still the future to be considered, when, according to the laws of business, there will be a change for the worse. When that time comes the demand will fall off, orders in hand will be canceled, prices will go down, profits will be smaller on a lessened volume of business. Then the newcomer in the field is likely to feel the change more acutely than his competitors who have been established for years. The new concerns will hurt the old, because the total product of the line will be greater, causing more acute competition and consequent lower prices. The demand will not so nearly equal the supply as would have been the case if no new competitors had entered the industry. But most of all, the newcomer would feel the change. Such a condition usually follows a period of extraordinarily strong demand, and when it comes it means the survival of the fittest.

If the man who contemplates becoming a manufacturer will base his decision upon the average of 10 or 15 years' experience of the line which he would enter he will be acting with intelligence. He may not be able to obtain exact figures, but he can get a good general idea of the money earning capacity of the business during good times and bad. Averaging in the present and the immediate future, which looks bright and promising, he may proceed with confidence in something approaching exact knowledge. He can afford to be a little optimistic, in common with the established manufacturing world. But too great optimism may mean catastrophe later on. It is quite probable that if these precautions were taken not a few contemplated undertakings would be abandoned.

A mistake is made in thinking that because an established manufacturer is enlarging his works a new enterprise can be founded in his line with the same hope of success. The manufacturer knows the business. He has the advantage of a full acquaintance with past conditions and makes his plans with the expectation of again meeting hard times somewhere in the future. He remembers the time when he saw his reserve fund melt away like snow in springtime. He strikes the average of past experience. He has his costs in hand, both of the present and of the past. He acts on exact knowledge. The man who would be his competitor should recognize the advantage which this full fledged experience affords.

It must not be inferred that there is no opportunity for new men in manufacturing fields. The contrary is true, as it always must be. The danger does not lie with the new concern which starts in intelligently and conservatively under the management of men familiar with the making of the goods and the trade which they will reach. Trouble comes from those who enter a business in ignorance of what must be expected and of how to handle affairs under all sorts of conditions. It is usually this class of newcomer who plays havoc in a falling market by his lack of business knowledge and experience in making prices.

The Founders' Association as a Fighting Machine.

The tenth annual convention of the National Founders' Association, held in New York last week, differed from any that preceded it in that it was largely devoted to taking account of what the association had won in six months' resistance to the demands of the Iron Molders' Union. It matters not greatly how the particular issues raised by the union in May last are stated, the irreconcilable positions of the two organizations have long been plainly in view. The molders' leaders have insisted that a nine-hour day and an advance in the minimum wage, or the definite establishment of such a minimum, were the matters involved in the May strike. The signed agreement, with its full recognition of the union's participation in the fixing of shop conditions and its perpetuation of union customs unmodified, has been taken as a matter of course in the union's statements. It has been treated as though, merely a means of giving formal effect to the terms as to wages and hours that might be arrived at by the contracting parties. Very different is this summary of the issues as presented by President Briggs in his annual report to the foundrymen:

Every proprietor realized that a crisis had been reached in the foundry business. The Iron Molders' Union had for many years persisted in maintaining an apprentice ratio of 1 to 8, striking any plant which exceeded this ratio, at the same time admitting freely in public communications and elsewhere that to keep abreast of the demand for molders and make up for the natural diminution of the number of journeymen due to dropping out from the trade or to death required a ratio of 1 to 4. It pursued practically the same course in striking a shop because of the introduction of labor saving machinery, while its officers frankly admitted machines had come to stay. It persisted in maintaining the minimum wage rate which reduced all men to the same level, irrespective of capacity, ability or industry. Where the union conditions were strong enough it had persisted in fining any molder who exceeded the amount of work specified by the union. In nearly all the large foundry centers shop committees had to be consulted in the discharge of incompetent men, the fixing of prices for piece work and the regulation of shop conditions. Because of all these arrogant abuses and the union demand that their continuance be fully recognized by the proprietors through the medium of a formal written, signed, sealed and delivered contract, the limit of human patience had been reached. The foundry industry had already suffered severely by these restrictions and further tolerance was simply an impossibility.

The statement presents to view an irrepressible conflict, the cause of which is deep seated and the occasion for which may come over night. The molders' demands in May furnished the occasion.

Without going over ground already covered in these columns, the remarkable features of the greatest labor contest the general foundry trade has seen remain to be pointed out. Labor unions have had frequent censure for blundering into strikes on a falling market. The May strike was certainly not of that class. With shops crowded with work, the belief was warranted that the foundrymen would not stop to fight. That many of them took a stand that emptied their shops of union men, and at the same time brought profitable work temporarily to a standstill, is proof of the firm determination to secure freedom from conditions long endured. The results as reported at the New York convention are a new and surprising demonstration of the resources of the National Founders' Association and of the possibilities of machine molding. The estimate of President Briggs that 2000 additional molding machines have been brought into service since the strike and that 4000 new men have been introduced into the machinery foundries of the country, while outputs in many cases have been increased, presents a record without parallel.

The foundrymen argue that if these things can be done in the green tree of unequalled prosperity, greater things may be expected in the dry, whenever that comes. Reprisals may follow, and some of the apparent fruits of victory may be lost, but the Molders' Union has caused to be added to the open shop list many foundries in which

It is safe to say it will only find a footing again when it consents to be a very different sort of union from what it has been under its present administration.

CORRESPONDENCE.

"Old Style" Roofing Plates.

To the Editor: Referring to the editorial entitled "A Square Deal in Roofing Plates" in *The Iron Age* for November 8, we think an explanation is due your readers of our position regarding roofing plates.

The best roofing tin that can be made at any cost has always been our standard, and we have advocated it persistently through all the phases of the industry, particularly within the last few years when unfortunate American competition on account of conditions has steadily debased the quality.

You allude to certain appellations in the way of brands that have become meaningless, such as "old style," "old method," "redipped." We originated the words "old style." They were never used before in any shape or form, descriptive or otherwise, until we used them; in fact, at that time it was not necessary to describe in any way the well-known Welsh brands of roofing tin. The name was a sufficient assurance of quality, and that quality was never questioned on the part of the American buyers. There was no competition, as the American importer, and consequently the American buyer, paid any reasonable price, which encouraged the Welsh maker to keep up the quality of his brand. The American consumer of American tin plate has suffered from excessive and unrestricted competition among American makers, striving to undersell each other in point of lower cost. The American standard therefore of to-day is very much below the Welsh standard of the importing days.

Going back to the use of the words "old style," as our brand of the highest grade of roofing tin that can be made at any cost, and whose quality is the same as it always has been, we enjoyed the use of these words as our brand for many years, and our right to their exclusive use was never questioned. They have been appropriated since, and their use has brought in the words "old method," or "extra coated," or "redipped," &c., which, as you state in your editorial, have little or no meaning as roofing tin is made to-day.

N. & G. TAYLOR COMPANY.

PHILADELPHIA, PA., November 15, 1906.

Copper Production in 1905.

The production of copper in the United States in 1905, according to a bulletin just published by the Geological Survey, exceeded 901,000,000 lb. The three leading regions of production are Butte, Mont.; Arizona, and the Lake Superior region. In Idaho and Utah there is a marked increase, while in California and Tennessee there is a decrease which is believed to be temporary. The following tables show the production in pounds by States or sections in 1904 and 1905:

	1905.	1904.
Montana	314,750,582	298,314,804
Arizona	235,908,150	191,602,958
Lake Superior.....	230,287,992	208,300,130
Utah	58,153,393	47,662,889
California	16,697,489	28,529,023
Tennessee and Southern States; Maine and New Hampshire; Middle States	15,134,960	15,211,086
Idaho	7,321,585	2,158,858
Wyoming	2,530,531	3,565,629
New Mexico.....	5,334,192	5,368,666
Colorado	9,404,830	9,566,586
Alaska	4,900,866	2,043,586

In neither Oregon, Washington, Nevada nor South Dakota did the production reach 1,000,000 lb.

An interesting table is given showing the cost of producing and marketing at a given mine in cents per pound, as follows:

	1905.	1904.
Mine costs.....	0.1131	0.1054
Construction	0.0055	0.0108
Smelting, freight, selling, &c.....	0.0151	0.0136

A greatly augmented output for the Butte mines is predicted for the year 1906, owing to discoveries of higher grade ores in the lower levels and the end of litigation which has retarded production in several mines. In Arizona the increase is chiefly at Bisbee, Globe and Jerome.

The total production for the world in gross tons for the last three years is as follows:

1903.....	586,143
1904.....	649,300
1905.....	701,252

The total imports for 1904 and 1905 in pounds were as follows:

	1904.	1905.
Copper ore, pounds.....	600,844,160	663,602,240
Copper content, pounds.....	38,947,722	50,105,300

The exports were valued as follows, including ore and matte, pigs, bars, old copper and manufactured products:

1903.....	\$44,365,155
1904.....	76,019,471
1905.....	86,408,731

According to returns from copper companies the stock on hand January 1, 1905, was 95,062,862 lb., and on January 1, 1906, 73,941,814 lb.

The Harbison-Walker Refractories Company.

The annual report of the Harbison-Walker Refractories Company, Pittsburgh, was issued to the stockholders last week and was very favorable. Deferred dividends on the preferred stock aggregating 2½ per cent. were declared. Net earnings for the year were \$1,739,082, the largest in the history of the company. The income account as compared with 1905 shows the following:

	1906.	1905.
Net profits.....	\$1,739,083	\$1,169,990
Improvements, new construction and depletion	239,689	88,962
Balance	\$1,499,393	\$1,081,028
Interest	145,438	154,812
Balance.....	\$1,353,955	\$926,216
Preferred dividends.....	576,000	576,000
Surplus.....	\$777,955	\$350,216

Of the surplus for 1906, 1905 and 1904, the sum of \$175,000 was used in the purchase and cancellation of bonds.

The balance sheet as of September 30, with comparisons, follows:

Assets.		1906.	1905.
Property		\$28,747,710	\$28,735,956
Betterments		721,291	727,800
Deferred charges.....		514,207	409,206
Inventories		1,104,748	1,003,506
Cash		722,990	547,906
Accounts received.....		1,362,520	1,101,495
Bills received.....		18,672	21,022
Totals.....		\$33,193,133	\$32,546,891
Liabilities.		1906.	1905.
Preferred stock.....		\$9,600,000	\$9,600,000
Common stock.....		18,000,000	18,000,000
Bonds		2,790,000	2,965,000
Pay roll.....		67,762	62,249
Reserves, &c.....		508,699	409,952
Accounts payable.....		210,584	231,549
Purchase money mortgage.....		40,000
Surplus		2,016,097	1,238,141
Totals.....		\$33,193,138	\$32,546,891

Ratepayers at the recent election in Port Arthur, Ont., voted to guarantee \$75,000 bonds of the Meisel Mfg. Company, and to lend the Seaman-Kent Company \$15,000. The Meisel Company will establish works for the manufacture of mill machinery and heavy harvesting machinery. The Seaman-Kent Company will establish a factory for the making of hardwood flooring and mantels.

The number of ships booked this fiscal year by the American Shipbuilding Company is 50, one more contract for a \$400,000 steamer having been closed since last accounts. For the fiscal year ending June 30 next the company cannot, even under the most favorable circumstances, complete more than 36 of these vessels.

What Is an Engineer-Constructor?*

BY GEORGE A. DAMON, MANAGING ENGINEER OF THE ARNOLD COMPANY, CHICAGO.

One prominent element of modern industrial life is bigness. We have large business corporations, combined railroad systems, extensive manufacturing concerns and comprehensive enterprises in all lines of commercial activity.

Another dominant element is efficiency, which may be taken as the key word of modern business life and engineering practice. The constant aim is not cheapness in construction or equipment, but effectiveness, the greatest return for the outlay.

These two elements chiefly have brought about a condition in which we have the necessity for a technical organization ready to produce large results in an effective way. Between the desire for bigness and efficiency and its fulfillment is the field of operation for the creative and constructive abilities of the engineer-constructor.

An Engineer-Constructor Is an Organization

and not an individual. It makes possible the most effective combination of technical theory with practical experience, and provides for the use of team work in connection with the designing and building of properties. Its aim is to attain the greatest economy in effort, time and money—its province is to do things in the most effective way.

In its broadest development such an organization need not be confined to any one class of enterprise. Here is something to be built which requires for its completion a combination of conception, technical knowledge, constructive experience and executive ability. Whatever it is the engineer-constructor should be prepared to carry the proposition through from beginning to end without technical assistance from outside the organization. To be most effective such an organization should have at its command the technical knowledge and experience of the past, the ability to analyze situations and discover the truth from conflicting testimony, the imagination to conceive unprecedented results and courage to overcome obstacles, the ambition to improve existing systems and the honesty to spend money without favor or graft, and finally loyalty to itself and to its client, which will protect in every way the interests of all concerned.

An engineer-constructor, therefore, is nothing less than an ideal employee who has the best possible preparation, the widest experience and the natural aptitude to do in a large way the big things which the development of this country is constantly requiring. Such an organization substitutes for the isolated efforts of one or more individuals an effective combination of the aggregate abilities of a number of experts and adds the enthusiasm and inspiration which comes from the contact of fellow workers.

The expression that "the team plays as one man" suggests the comparison of our ideal engineer-constructor organization to a modern football team, and as this idea grows upon us we can find considerable instruction and inspiration in the analogy.

Character of the Organization.

All the things that might be said in regard to getting together and developing a winning football team could be applied equally well to the building up of an organization to do the work of an engineer-constructor. To carry the illustration further, let us line up the candidates for this new kind of team—the more material to select from the better—we will always have use for substitutes.

We need a civil engineer, electrical engineer, mechanical engineer, structural engineer, sanitary engineer, chemical engineer, gas engineer, fire protection engineer, hydraulic engineer, mining engineer, architect, industrial expert, statistician, purchasing agent, construction superintendent, operating engineer, accountant.

An engineer-constructor, therefore, is nothing less than

number of these candidates are fitted together as a mechanic would build a machine, and the efficiency of such an organization for the purpose for which it is created depends upon, first, the perfection of its individual parts; second, the skill with which these parts have been brought together; and, third, the absence of any unnecessary friction during operation.

Such an organization should not be the maker or manufacturer of any equipment, nor be connected with the exploitation of any system of apparatus, nor interested in the introduction of any patented devices. In its highest stage of development it will not be connected except in a technical way with the financial interests which control the enterprise.

Carrying our analogy even farther, let us look at some of the plays with which the candidates will become familiar in some of the big games which they must be prepared to play.

Duties Entailed.

The carrying out of every big enterprise will entail nearly all of the following duties: Investigations and reconnaissance; preparation of preliminary reports; estimates of costs; estimates of probable earnings and operating expenses; surveys; preparation of plans and specifications; getting proposals and purchasing; letting contracts; field engineering; construction and erection; inspection; preparation of progress reports; record of costs; tests; operations; final reports and statistics; accounting.

It is important to gain as much ground as possible on every play. In playing an entire game from start to finish different men will have the ball in nearly every play, but the precision of the team work should be so perfected that every man will be in every play. To assist is fully as important as actually carrying the ball. Look over the various situations which this engineer-constructor team which we are developing is sure to face—is there any detail which the candidate for responsibility can afford to ignore? Is it not better to have an organization of trained men prepared to help each other do these various things, rather than depend upon unsupported individual effort?

Granted that such an organization of technically trained men can be brought together, what are some of the things which they may be called upon to do? A few of the things requiring such ability and experience in design and construction which first occur to us are as follows: Complete steam railroads; complete electric railroads; electrification of steam roads; hydro-electric plants; transmission systems; power plants; gas works; electric lighting systems; industrial establishments; buildings for all purposes; public service works.

In so far as an organization is prepared to carry out any of these enterprises effectively, just that far will it reach its highest development.

Laying Out a Large Proposition.

To show the possibilities of such an organization, let us pick out a team for the building of some large proposition. Let us take, for instance, the design and construction of a steam railroad locomotive repair shop, involving the expenditure of from \$2,000,000 to \$3,000,000.

In deciding on our men, we will make a study of the qualifications of each one, and at the same time we must have a clear conception of the work each one must be familiar with in order that there be no weak spots in our line or break in the organization. The selection of men with their chief duties will be as follows:

Industrial expert:

- Designing layout of shops.
- Planning method of handling work.
- Arrangement of tool and transportation equipment.

Electrical engineer:

- Providing power and lighting equipment.
- Laying out transmission systems.
- Planning telephone and signal systems.

Mechanical engineer:

- Design of power plant.
- Plan of heating and ventilating.
- Laying out air, gas and steam systems.

Structural engineer:

- Building foundations.
- Designing steel structures.
- In charge of reinforced concrete construction.

* Abstract of a paper presented to the Electrical Section, Western Society of Engineers, November 16, 1906.

- Architect:**
 Designing building superstructure.
 Choice of fixtures.
 Laying out landscape work.
- Civil engineer:**
 Directing grading.
 Testing of soil.
 Construction of track.
- Sanitary engineer:**
 Design of sewage system.
 Construction of water works.
 Choice of plumbing.
- Purchasing agent:**
 Selecting markets for material.
 Checking bills of material.
 Arranging for delivery of material.
- Constructing superintendent:**
 Organization of construction force.
 Consideration of time element in construction.
 Settling labor difficulties arising in connection with construction work.
- Operating engineer:**
 Consideration of economies in operation.
 Securing reliability in operation.
 Insuring effectiveness in operation.
- Accounting department:**
 Keeping pay rolls.
 Making record of costs.
 Preparing progress reports.

Here are eleven men—each one selected for his particular ability to solve the problems suited to his individual training and experience. Each man has won his position as the result of a gradual growth which has demonstrated his reliability and resourcefulness. Many of these men have played this game before, and together, and are always eager for a proposition which will tax their strength and skill.

Let us watch the play. First will come a number of preliminary studies, showing the proposed sizes, designs and relative arrangements of the buildings. There will next be forthcoming a carefully prepared report, showing the advantage of the finally selected arrangement, and the suggested construction of each of the buildings, together with a description of the equipment required. An important part of this preliminary report is an approximate estimate of cost, based upon a careful consideration of all the items involved in the construction.

With the general layout and the preliminary report and estimate approved, the next move is to prepare the plans and specifications. To indicate the scope of this work the following illustrative classification is shown, the numbers being the key which is placed in each drawing, specification, data sheet, report, or letter which may be originated as the work progresses:

CLASSIFICATION FOR BATTLE CREEK (MICH.) SHOPS, GRAND TRUNK RAILWAY SYSTEM.
 Contract No. 74.
 GENERAL INDEX.

Sections of Classification.

- | | |
|----------------------------|------------------------------|
| 74000—Organization. | 74600—General equipment. |
| 74100—Building structures. | 74700—Power plant equipment. |
| 74400—Track. | 74800—Tool equipment. |

Parts of the Work.

- | | |
|--------------------|-------------------------------|
| A—Yard. | K—Car machine shop. |
| B—Power house. | L—Truck shop. |
| C—Storehouse. | M—Coach and paint shop. |
| D—Oil house. | N—Freight car shop. |
| E—Office building. | O—Planing mill. |
| F—Locomotive shop. | Q—Dry kiln. |
| G—Forge shop. | R—Scrap platforms, sheds, &c. |
| H—Iron foundry. | S—Turntables. |
| I—Pattern shop. | T—Yard crane. |
| J—Frog shop. | U—Pipe tunnel. |

Detail Classification.

- 74000—ORGANIZATION.
 74001—Contract.
 74002—Home office fixed charges.
 74003—Legal expense.
 74004—Preliminary reports.
 74005—Surveys.
 74006—Engineering.
 74007—Accounting.
 74008—Construction Tools.
 74009—Construction office supplies.
 74010—Temporary construction.
 74011—General construction labor.
 74012—Superintendence.
 74013—Insurance.
 74014—Traveling and living expenses of representatives.
 74015—Tests.
 74016—Preliminary operation.
 74100—BUILDING STRUCTURES.

- 74101—Preparation of site.
 74102—Excavation and fill.
 74103—Piling.
 74104—Foundations.
 74105—Superstructure masonry.
 74106—Structural steel and iron work.
 74107—Carpenter work.
 74108—Mill work.
 74109—Roofing.
 74110—Sheet metal work.
 74111—Plastering.
 74112—Painting and glazing.
 74400—TRACKS.
 74401—Preparation of right of way.
 74402—Grading.
 74403—Tie and Track laying.
 74404—Switches and special work.
 74405—Ballasting.
 74406—Fencing.
 74407—Cattle guards, crossings, signs, &c.
 74408—Bonding.
 74600—GENERAL EQUIPMENT.
 74601—Drainage system.
 74602—Plumbing and lockers.
 74603—Water system.
 74604—Heating system.
 74605—Piping system (except for heating system).
 74606—Lighting system.
 74607—Power system.
 74608—Telephone and signal systems.
 74609—Transportation systems:
 Transfer tables.
 Turntables (large).
 Yard cranes.
 74700—POWER PLANT EQUIPMENT.
 74701—Machinery foundations.
 74702—Coal and ash handling apparatus.
 74703—Grates and stokers.
 74704—Boilers and settings.
 74705—Breeching and connections.
 74706—Stacks and draft equipment.
 74707—Heaters, superheaters and economizers.
 74708—Water softening plant.
 74709—Pumps.
 74710—Air compressors.
 74711—Engines.
 74712—Condensers.
 74713—Piping and covering.
 74714—Generators, compensators, transformers and exciters.
 74715—Switchboard and generator leads.
 74800—TOOL EQUIPMENT.
 74801—Line shafting and all shafting and motor supports.
 74802—Forge shop blast and exhaust ducts.
 74803—Individual cranes and holsts.
 74804—Traveling cranes.
 74805—Work benches and material racks.
 74806—Fire protection apparatus (except piping).
 74807—Foundations for machine tools.
 74808—Machine tools.
 74809—Erection of machine tools, countershafts, &c.
 74810—Planing mill shavings exhaust system.

In purchasing, the engineer-constructor should find some advantage over an occasional buyer. He is in the market constantly, is favorably known by the manufacturers of standard equipment, and buys apparatus delivered f.o.b. cars, doing all erection work as far as possible with his own experts, and calling on the factory for assistance only when necessary.

All Departments Should Work Together.

There should be the greatest unity between the engineering, the purchasing and the construction department. It is always better to have the construction superintendent in the office while preliminary decisions are being made and bills of material are being prepared.

Throughout the entire progress of the work systems are in use to keep all concerned informed as to each move. The construction office is advised by the home office as to the material ordered and as to the probable delivery of this material. The home office is advised as to the receipt of material on the job, as well as to the progress of the construction work, and any reports and advices as to the labor situation. To accomplish the former copies of contracts for apparatus and orders for material are sent to the superintendent in charge of construction. Such reports and orders contain exact information as to the material covered by them, as well as to the time at which this material is expected to arrive on the work. A card system in which are entered all orders and contracts is used in the home office, and is designed to follow up and secure prompt delivery of all material and apparatus. In case of any changes in time of delivery of material, the construction superintendent is advised in advance, and is thus in position

to make any alterations necessary in his programme. The importance of promptly delivering the material on the job cannot be over estimated, and the value of a system that will provide for the delivery of the materials in accordance with an approximate schedule previously arranged for will appeal to all interested in construction work.

Records of all material received on the job are kept by the superintendent in the form of a material report. These reports are written out in a duplicate book as each shipment is received, and one copy is sent without delay to the main office. This serves to keep the home office very closely in touch with the field work, so far as the receipt of material is concerned.

Progress Reports.

In construction work consisting of a great many items, such as will be found in railroad shops, it is very desirable to know with a fair degree of accuracy the exact progress of the work. Certain lines of the work, such as the delivery and installation of machinery, are dependent upon the progress of other work, such as the completion of the buildings and foundations. In order that this information may be always at hand, progress reports from the work are received at stated intervals, usually two weeks apart, giving in detail the progress of the work under each classification head. This information is kept in form for convenient reference, and is useful in a variety of ways. Not only do these reports keep the engineering force in touch with the progress of the work, making it possible to more efficiently insure the work coming in proper sequence, but they also provide the information necessary to make decisions as to changes in detail, in case such are found necessary after the work has been begun. These progress reports, together with a record of moneys expended for material and labor at any date, give timely information as to the actual cost of the work as compared to the estimated cost. As such reports are made on the work under each classification heading, any variation of the cost from the estimate is at once detected. This is of importance to the constructor who proposes to complete a certain improvement within a definite estimated cost, and to the client's official who may be charged with the responsibility of protecting a definite appropriation.

Wherever it is possible curves or diagrams are used to represent the condition of affairs of which record is to be kept. A chart showing the progress of the work on building construction is easily made, and shows very clearly at a glance the exact condition of the work at any time. At the end of each two weeks' period, the total expense that has been incurred during the two weeks previous is plotted under each classification head, and this area on the chart indicated in such a way as to designate the progress made during the particular period in question. A glance at the chart will show the total amount completed under each classification represented on the chart at the time the last entry was made, as well as the amount of work that was done during the various classifications during each period considered.

Moreover, it is at once evident that, during the period of the fifth payroll about 10 per cent. of the work on the engine pits, 20 per cent. of the concrete superstructure, 36 per cent. of the brick work, 15 per cent. of the sills and coping, 40 per cent. of the windows and small doors was completed, and no work was done on the smokejacks and ventilators, none on the roofing and none on the sash operators and foundations. In other words, these progress reports become the graphical history of the job. After having made out the necessary reports covering both the material and the labor that have been used on the work, it is a very simple matter to embody these results in the chart. A copy of this chart is then sent to the main office where it remains until the time for the next report, at which time it is sent back to the job for the additions that have occurred during the period.

Progress Photographs

are taken of the work at intervals of about two weeks. These show at a glance not only the general progress of the work, but many construction details as well, which are of interest and value. These photographs are

of a standard size, and mounted on cloth so as to be bound in convenient form for reference. All the reports just referred to, viz., the progress reports, charts and diagrams, while very easily obtained and requiring but little work in their preparation, supply a great deal of valuable information, and are of worth far exceeding the trouble and expense contracted in securing them.

Although every facility is provided for keeping the main office and the construction office in close touch, it should not be understood that the engineering is done at arm's length, and that all plans and specifications are devised and completed by an engineering force in the office to be sent down to the construction superintendent on the job for his execution. A competent engineer is in charge of all construction work, and spends a certain amount of time in the field, thus putting him in close touch with the situation, and enabling him to more efficiently direct the detailed engineering work that is done in the main office.

It would be a big mistake to think that such an organization as we are outlining could be got together and perfected in its work in a short time. A winning team is not made in a week, a month, or even a year. It takes time to find the men, to break in raw material, to perfect the plays, to develop a system and to create a loyalty both inside and outside the team. In the case of our engineer-constructor parallel it will probably take years, and it is evidently for this reason that this very inviting field is occupied by so few organizations who are really prepared to do the work justice. Our football players have learned the benefits of concentrated co-operative efforts when applied to their sport much sooner and better than have technical teachers and graduates recognized the same truths as applied to our life work, and yet the advancement of technical progress is certainly more important than the perfection of the game of football. The technical student of to-day is to be congratulated upon having before him such a splendid opportunity in a field which has not been worked harder than that occupied by the engineer-constructor.

Cost Plus a Percentage.

Most of the work of this company is done on the basis of "cost plus a percentage"—that is, the work is done at actual cost, and then the engineer-constructor gets a percentage fee for his services. By such an arrangement the client or purchaser is relieved of the necessity of organizing a technical force of his own, or of employing a number of individual specialists. If the actual construction work is turned over to the engineer-constructor, then the client is relieved of the inconvenience of obtaining proposals and awarding contracts to a large number of separate contractors, with the attendant delays, conflicts and "extras," which even the closest supervision will hardly avoid.

The difference between the "cost plus a percentage" and the "cost plus a fixed sum" plans is not generally understood. If an engineer constructor is thoroughly trained in drawing plans, has sufficient actual experience to make a reliable estimate, is absolutely honest in all things, and has complete control of a competent construction organization, then the "cost plus a percentage" arrangement is the better; but if the work is planned by an engineer and architect, and the actual building work is turned over to a separate construction organization, thus maintaining the old relationship of engineer and contractor, then the "cost plus a fixed sum" plan, no doubt, has advantages. The "percentage" plans express a shade more of confidence between the client and the builder than the "fixed sum" basis.

If the duties of making a preliminary report, preparing a careful estimate, drawing up the plans and specifications, purchasing the materials, building the structures, erecting the equipment and installing the machinery are turned over to one reliable engineer-constructor organization on a "cost plus a percentage" plan with the privilege to the client of canceling the arrangement at any time, if the progress, quality or cost of the work should prove to be unsatisfactory, it is hard to conceive of a more effective way of getting results, and it is very probable that much of the important work of the future will be done upon this basis.

THE BIRMINGHAM DISTRICT.

Some Recent Developments in the Iron Situation in Alabama.

(Special Correspondence.)

BIRMINGHAM, ALA., November 17, 1906.—The coming of abundant Northern capital into the Southern iron industry marks a new period in its development. The extensive programme of new construction by the Tennessee Coal, Iron & Railroad Company, involving in work already laid out an expenditure of \$7,000,000, represents a régime of which iron and steel making in this district hitherto has been largely innocent. A characteristic of the Tennessee Company always heretofore, and particularly under the administration preceding the last one, was its insufficient financial resources. Its engineering staff found abundant opportunities to spend money in ways that would have yielded good returns on the investment. But old obligations steadily blocked the way. In the dark days of the nineties, when the Southern furnaces were floundering in the mire of \$6 pig iron—and truthful history records a transaction as low as \$5.65—the financing of the Tennessee Company's ordinary operations was often carried on in 24-hr. periods, one day closing without any clear way appearing to meet the demands sure to come with the next.

A New Basis of Values.

The change the past year has brought to the Tennessee Company is seen also in a measure in other iron and steel companies. So many extravagant hopes have been entertained of the iron industry of Alabama, and the realization of most of them has been so long deferred, that it is not surprising Northern capital has not rushed in, with all the opportunities afforded through the various consolidation schemes of the present prosperous period in iron. It has been the habit to say that some day interests with ample capital would get behind the Alabama iron industry. Then, it has been granted, the beginning of the long predicted day of great things might be looked for. Whether the Tennessee Company's properties, for example, have made their last change of ownership for a long term of years is a question not unanimously answered. But the present owners have given all the proof that could be expected of their intention to stay with the properties and develop them to an extent not approached by anything undertaken hitherto.

The leap to a new standard of values for mineral properties and for the securities of iron and steel companies is the outstanding fact in the new situation. A few men in Birmingham who have gone up and down the slopes of Red Mountain in the past 10 years and picked up leases here and bought land outright there have turned their foresight into moderate fortunes. And it really appears that the long chapter of losses in Southern iron properties is near its end—the unfortunate outcome of the Lookout Mountain enterprise notwithstanding—and that the day of iron and steel making for profit has come in.

Some Examples.

Only a few years ago men familiar with the resources of the Tennessee Company, for example, would have put the real value of its stock at scarcely more than 1 per cent. of what it brings in the market to-day. Of actual transformations in money values the *Manufacturers' Record* cites the following, which fairly represent the extent of the upward movement:

Only a little over a year ago Baltimore people who had every possible opportunity to learn something of the value of the stock of an Alabama coal and iron company which was controlled here had so little faith in the future of coal and iron properties that they were unwilling to buy the stock at \$10 a share, which within a year has advanced to \$70 or \$80 a share. Baltimore capitalists owning a 25,000-acre tract of coal land in West Virginia sold it for \$10 an acre about six years ago, and within a few months the buyer sold the timber on it for \$20 an acre and has within the last few months refused \$80 an acre for the coal on 6000 acres of it. It was not so many years ago when one of the leading iron companies of the South, finding it necessary to raise \$750,000, was forced to sell \$2,000,000 of 4½

per cent. bonds for 37½ cents on the dollar in order to secure money actually needed for development work, and the people who took the bonds did so only in order to try to save what they already had invested in the property. These bonds, of course, are now gilt edge, and \$5,000,000 of common stock, which was mainly bonus stock, has since been sold for over \$80 a share. A prominent West Virginian once sold 30,000 acres of Pocahontas coal land at 40 cents an acre, now easily worth \$150 an acre, and thought he was doing well.

New Values Look to the Future.

Yet the question may well be raised whether some present valuations of Southern properties are not to an extent anticipatory and whether account has been taken of the long programme of construction that is still ahead, and of the money and energy and engineering and managerial skill that must be concentrated on the problems now being attacked. Values of mineral properties have been underestimated heretofore, no doubt, but it needs to be remembered in discussing the hundreds of millions of tons of ore owned by this or that company that only a definite amount of these ores can be utilized in any year. If these Alabama ore reserves are to last 150 or 200 years, as some reckonings have it, the present worth of the ore that will only come out of the ground at or near the end of the period must be very small, or its future worth must be very large. Compounding on the basis of some estimates of present values would bring us into the precious metal class 50 years hence.

No doubt the negotiations between the Steel Corporation and the Great Northern Railroad gave the impulse to the new iron and steel movement in the South. The Hill deal suggested to men of large capital that the psychological moment had arrived for investment in Alabama ore and coal, and in the plants already existing to turn them into steel. It is significant that following the rehabilitation of the Tennessee Company and the later consolidation of various properties into the Southern Steel Company, both these corporations should have turned promptly to the buying of more iron ore lands. The acquisition of the Potter iron mines and lands on Red Mountain by the former and of the extensive brown ore properties of the Georgia Iron & Coal Company by the latter, showed a keen appreciation of the need of safeguarding against future contingencies that might come with the strengthening of rival interests. Allowing that the Potter acquisition was a bargain transaction for the Tennessee Company, it is to be said that \$800,000 for 2200 acres of land, presumed to contain 60,000,000 to 70,000,000 tons of ore—about 1¼ cents a ton—represents a widely different standard of valuation from some of the enthusiastic estimates of Wall Street origin.

Better Preparation of Ores.

It is conceded that the mineral reserves of Alabama have only been fairly scratched by the present iron industry of the State. As time goes on some longer hauls for ore may be necessary, but when that day comes there will be better sorting at the mines, and concentration may come to the relief of furnacemen who have long been used to 3 tons of ore to a ton of pig iron. To-day scarcely more care in mining or discrimination in the use of the raw material as it comes from the mine is exercised by some producers than was the case 15 years ago. The more important interests have discovered, however, that labor expended here brings large returns. One furnaceman, whose operations have been in the district northeast of Birmingham and in the Chattanooga District, has been well rewarded in increased pig iron output and in lowered fuel consumption by putting pickers at work to remove slate, gravel or other foreign materials from the ores before they leave the mines. The experiments conducted by Dr. William B. Phillips in the early nineties in the concentration of red fossil ores suggest what may be done eventually, though no practical use of that work has

been made as yet. The treatment consisted in calcining the ores and rendering them magnetic, preparatory to being treated in a magnetic separator. The iron content was increased to 60 per cent., but it was found that briquetting was necessary to supplement the process. In the case of the Alabama brown ores, which constitute a small proportion of the total, washing is employed at all the mines to remove sand and adhering clay. For the basic steel, which it largely draws into wire, the Southern Steel Company will employ an increasing percentage of brown ores.

Below are given typical analyses of ores entering into the mixtures of one important producer in the month of October:

	Red Ore.	Hard ore.	Soft ore.
Iron	36.60	45.92	
Silica	11.94	18.70	
Alumina	3.23	4.77	
Lime	17.16	3.13	
Phosphorus	0.31	0.35	
Water		1.50	
<i>Brown Ore.</i>			
Iron		43.54	
Silica		18.54	
Alumina		4.35	
Phosphorus		1.07	
Manganese		0.87	
Water		1.55	

Coal and Coke.

Coal washing is more and more practiced at the mines of the iron companies, and modern jigging machines are being installed instead of the old time log and trough washers. Better coke is the result, and lower fuel consumption per ton of iron has come about from increased attention both to ore and fuel. But the occasional record of 2500 lb. of coke to a ton of iron is not to be given a too sanguine interpretation. As a matter of fact, with the declining iron content of lake ores and the higher ash of many Northern cokes, that figure is not far beyond current fuel records in the North. Few Southern furnaces are under a 3300-lb. average and those exceeding that amount are numerous.

Inadequate Railroad Facilities.

Wherever one goes in this district the labor and railroad embargoes are more and more in evidence. Steel manufacturers in the North, having connections with double track, three track and four track lines, can scarcely sympathize with the Southern shipper. The time has come when these single track Southern roads must seriously consider the building of second tracks. Financial ways and means must be found and the construction programme must needs be extensive. Alabama basic open hearth rails should therefore find a large market in the next half dozen years right at home and in nearby States.

It is plain that the Southern roads have not been as forehanded as the East and West trunk lines in buying locomotives and cars. It is a question if the car losses from wrecks are properly allowed for in providing for replacements. It is certain that allowances for the growth of Southern trade and industry have been far from sufficient. Pig iron has been piled up in furnace yards in recent weeks because there were no cars available to send it to the foundries clamoring for it. Coke ovens have been idle because the mines could not get cars. Ore supply has been scarce for the same reason. In every direction are evidences of the pains of prosperity that have made production expensive and at times have almost paralyzed the producing organism.

The Labor Problem.

When it comes to the problem of labor, which, like the poor, is always with the South, the outside student of the situation gets little help from those on the ground. Everywhere is a pessimistic view of the future of negro labor. The State immigration associations have done something, and the recent South Carolina importation of 500 Europeans is made much of as marking the beginning of systematic effort to bring in men enough to do the work of the South, more and more of which is waiting to be done. In the Birmingham District are a few Italian colonies, the principal one being at the Thomas Works of the Republic Iron & Steel Company. The Tennessee Company and the Alabama Consolidated Coal & Iron

Company have also brought in Italians, who have been more efficient than the negroes, and before the present demoralization of all labor, due to the palpable surplus of jobs, actually stimulated the negro to steadier work through the fear that more and more Italians would be introduced.

But common labor at mines, coke ovens, blast furnaces and steel works is still substantially all negro labor, and the negro will be the chief dependence for such work for a long time. The situation was summed up in the remark of one furnace manager that "if the negro were paid 75 cents a day instead of \$1.25 we would have little trouble. Then he would have to work four and five days a week, while now only two or three days' work a week gives him money enough to supply his wants." Wherever a new operation is started or an old one increased, workmen can only be secured by hiring them away from other employment. Discipline is almost out of the question. At one blast furnace plant last week the blowing out of one of the two stacks was seriously considered. Due to the idling of the negro workmen at mines, coke ovens and furnaces neither stack was getting more than a two-thirds product, and it was figured that with one furnace properly looked after and fed with materials perhaps as much iron could be made as under the abortive attempt to keep two stacks going. Out of 400 negroes employed by one blast furnace company only one reports for work six days in the week.

It is a curious commentary on the cheap labor of the Southern iron industry, of which much was written at one time, that machinery is being introduced more and more to supplant common labor. Conveying machinery, for example, has been regarded as showing largest economies in the North, where even common labor is expensive. At several plants in the Birmingham District equipment is now being installed to do the work heretofore done by the lowest priced workmen. This labor has become so expensive, measured by its small performance, and even at that the supply of it is so much short of the demand, that telpherage systems (as at the Ensley wire mills of the Southern Steel Company) and lifting magnets for handling pig iron, billets and other products, are being installed. More and more the skip hoist and the bin system of the North are coming in at Southern furnaces. The casting machine is no rarity, and where sand casting is the rule no doubt the pig breaker will soon find its place. It is plainly the purpose of iron and steel works managers—and necessity compels it—to employ machinery in every possible service in which it will displace hand labor.

Climatic Influences.

In this connection a word should be said on the effect of the Alabama climate upon Northern men. It has been the common notion that managers, superintendents and mechanical and metallurgical engineers going from Northern works to responsible positions in the South eventually succumb to the de-energizing influence of the Southern atmosphere and habit of life. It has been argued, too, that Northern men taking up new positions in the South are apt to be defeated in their efforts to increase the native pace. It may be that there is history to substantiate this view. But it should also be recorded that conversation with men of Northern experience who have come to the Birmingham District has elicited emphatic dissent from the idea that the Northern desire to push things cannot long survive in this climate. Here, as elsewhere, results will tell the story, and it may at least be said that Northern achievement has afforded evidence of more than one sort that the Southern soil is not as unfriendly as has been thought.

Output and Costs.

With all the advance in pig iron prices in recent months and all the strain to increase output and make the utmost of prosperity while it lasts, pig iron producers in this territory appear to have been steadily defeated in their efforts. In the first half of this year Alabama produced 819,300 tons of coke pig iron, as against 848,669 tons in the second half of 1905. Last month, the record month of the year in all districts, the Alabama output was 143,254 tons, more than 1500 tons short of the 144,804

tens made in October, 1905. In the three months preceding October, this year, the total pig iron output of the State was 390,490 tons; in the corresponding three months of last year, 387,989 tons. A year of struggle to increase production has been practically without result, though an entirely new furnace has been blown in at Ensley and 30 furnaces were active in September and October this year, as against 28 and 29, respectively, in the corresponding months last year. The new furnace of the Alabama Consolidated Coal & Iron Company at Gadsden really waits for raw materials, to go in blast, and at the Thomas plant of the Republic Iron & Steel Company, the most modern furnace group in the South, the output of the past half year would have been greater had the ore supply been available. To-day it is reported that two furnaces long inactive are to be put in shape for operation. It is hard to see, under present transportation and labor conditions, how any more capacity can be made effective except at the expense of that already running. Indeed, the spectacle of industry in Alabama to-day is that of being whipped to a standstill by excessive prosperity. Cost sheets tell the story. The furnaces that can make \$9.50 pig iron to-day can be counted on the fingers of one hand, and it is doubtful if another equal number can come within \$10, while furnaces depending largely upon the market for ore and coke are making a very moderate profit on the \$13 pig iron they are shipping.

Improvements under way at individual plants are reserved for later mention.

Smoke Prevention at Pittsburgh.—A recent meeting at Pittsburgh of a special Council committee to consider measures for the prevention of smoke was attended by 100 manufacturers, fuel experts, engineers and others. Addresses were made urging the desirability of greater effort for the prevention of smoke. Among the speakers were W. C. Reitz, treasurer of the Pittsburgh Steel Company; John Z. Speer, formerly of Shoenberger, Speer & Co.; I. W. Frank, president of the United Engineering & Foundry Company; Calvin Wells, president of the Pittsburgh Forge & Iron Company; J. A. Holmes and D. T. Randall, Government fuel experts; Charles Cunningham, superintendent of buildings of the Carnegie Technical Institute, and others. Mr. Reitz said that his company had succeeded well with the installation of automatic stokers, and its stacks were practically smokeless. Mr. Speer called attention to the fact that boilers are run beyond their capacity and that this is the cause of much of the smoke produced in downtown districts. He considered smoke prevention entirely feasible if manufacturers set about to accomplish it. Further hearings will be held by the committee preparatory to reporting an ordinance.

British Iron Ore in 1905.—The British Home Office returns show that the output of iron ore in the United Kingdom in 1905 was 14,590,703 gross tons, valued at £3,482,184, an increase of \$16,421 tons, and of £356,370 in value over 1904. The ore yielded 4,760,187 tons of pig iron, or nearly half the total quantity of pig iron made in the country. Including imports the total of iron ore available for furnaces in the United Kingdom in 1905, exclusive of mill and forge cinder, was 22,423,397 tons, as compared with 20,418,384 tons in 1904. "Purple" ore imported in 1905 amounted to 524,059 tons, as against 557,128 tons in 1904. The "purple" ore is calculated at 75 per cent. of the total cupreous iron pyrites imported, the amount of the latter being 698,746 tons in 1905, and 742,837 tons in 1904. Cleveland ores mined in 1905 amounted to 5,944,047 tons or 40.7 per cent. of the total produced in Great Britain. The average price of these Cleveland ores was 3s. 10d. per ton, or 3d. more than in the previous year.

At a conference held in Pittsburgh last week between officials of the Republic Iron & Steel Company and the Amalgamated Association it was found that the average price on shipments of iron bars in September and October did not warrant an advance in wages of puddlers and heaters for November and December. Puddlers have been receiving \$5.75 a ton, and this rate will continue in force during this and next month.

PERSONAL.

William H. Pfahler, president of the Model Heating Company, Philadelphia, sailed from New York November 15 and will spend some months in Southern Italy in the hope that his health may be improved.

Dr. William B. Phillips, for several years in charge of the Geological Survey of Texas, which he brought to a new stage of efficiency, has returned to Birmingham, Ala., and re-established his metallurgical engineering offices, known as the Birmingham Testing Laboratory.

Robert Wuest, acting commissioner of the National Metal Trades Association, sailed November 17 for Jamaica on a vacation of several weeks.

M. R. Porter has been appointed sales manager of the Pittsburgh Gage & Supply Company, Pittsburgh, Pa. Mr. Porter has for many years occupied a similar position, having been an officer and director of the Belknap Hardware & Mfg. Company, Louisville, Ky.

Charles E. Sammond, vice-president and treasurer of the Stowell Mfg. & Foundry Company, South Milwaukee, Wis., has been elected one of five directors of the Milwaukee Auditorium Association, which will have in charge the erection and management of the new \$500,000 auditorium.

H. Van Atta, for the past 15 years superintendent of the J. L. Mott Iron Works, Mott Haven, N. Y., has joined the organization of Geo. K. Hooper, mechanical engineer, 11 Broadway, New York. The addition of Mr. Van Atta to his already large staff enables Mr. Hooper to handle readily any problems relating to manufacturing industries, especially such as arise in foundry operations.

W. C. Crowe has been made superintendent of the plant of the Aetna Foundry & Machine Company, Warren, Ohio.

B. R. Shover, formerly connected with the electrical department of the Ohio Works of the Carnegie Steel Company at Youngstown, Ohio, has been made general superintendent of the electrical department of the new plant of the Indiana Steel Company at Gary, Ind.

The French Government has retained Charles M. Jacobs, chief engineer of the Hudson Companies, who planned and had charge of the Pennsylvania Railroad tunnels under the North and East Rivers, New York, to prepare plans for a mile long tunnel under the River Seine, from Rouen to Havre. Mr. Jacobs has forwarded to the Government plans of the proposed tunnel, with an estimate of cost based on borings and investigations which he made recently. The Government officials are now investigating the plans and it is probable that the work will shortly be begun. It is considered rather remarkable here that the French Government should come to this country for advice in a project of the kind, but it is probable that Mr. Jacobs has had more experience in this class of work than any other engineer. He built the Ravenswood gas tunnel, the first under the East River, and has had charge of the construction of the tunnels under the North River for the Pennsylvania Railroad and the Hudson Companies.

Winter Weather Checks Ore Shipments.

DULUTH, MINN., November 20, 1906.—(By Telegraph.)—With the harbor full of ships awaiting ore cargoes and docks and terminals full of ore very little is moving. Railroads have notified shippers of their refusal to supply cars till the weather changes and are putting every man possible at work clearing ore dock pockets and cars. A severe and unusually early cold snap, accompanied by the heaviest single snowstorm ever known on the Mesaba range, may have practically stopped the ore business for the remainder of the season and has at least checked the movement most seriously. Mountain Iron Mine, the largest shipper, which had six shovels loading ore, now has 18 in. of snow in the pit.

D. E. W.

NEWS OF THE WORKS.

Iron and Steel.

Some changes are being made in the various departments of the plants of the Whitaker-Glessner Company in Wheeling, W. Va., and Martins Ferry, Ohio. At the Wheeling plant a sheet mill is being changed to a tin mill on which black plate will be rolled. Some of the heating furnaces are being changed from gas to coal on account of a shortage in supply of gas. At the Martins Ferry plant a new galvanizing plant is being installed, it being the intention to paint and crimp all iron at this plant instead of at the Wheeling works, as is now done. Several other improvements, among which is the enlarging of the Martins Ferry plant, are contemplated.

The Norwalk Steel & Iron Company, Norwalk, Ohio, is installing charging apparatus to replace hand labor on its heating furnaces. The new equipment is being furnished by the Wellman-Seaver-Morgan Company, Cleveland, Ohio.

The Franklin Rolling Mill & Foundry Company, Franklin, Pa., has just completed an extension, 80 x 120 ft., to its plant, which will be used as a stock room for shearing stock.

D. B. Torpy of Marietta, Ohio, has been appointed receiver for the United Sheet & Tin Plate Company, which has plants at Marietta, Newcomerstown and Byesville, Ohio.

The Baldwin Steel Company, New York, has been incorporated, with a capital stock of \$400,000.

The West End Rolling Mill Company, Lebanon, Pa., has advanced the wages of its puddlers from \$4 to \$4.50 a ton.

The Alan Wood Iron & Steel Company, Philadelphia, Pa., has purchased the property of the Conschohocken Quarry Company, including the village of Connaughton, in Plymouth township, Pa. It has been reported that the company will erect a mill for the manufacture of armor plate, but we are informed that it does not contemplate making armor plate, at least for the present.

The United Steel Company, Canton, Ohio, is now operating a new 50-ton basic open hearth furnace. This, in connection with a new four-hole soaking pit, a new machine and blacksmith shop and other additions to buildings and equipment, increases its capacity about one-half.

The Portsmouth Steel Company, Portsmouth, Ohio, has started up an additional open hearth furnace, the installation of which necessitated the extension of its open hearth building. The plant now consists of five 40-ton furnaces, four basic and one acid.

The Pennsylvania Engineering Company, New Castle, Pa., has a large force of men employed on the rebuilding of the Republic Iron & Steel Company's Hall blast furnace, situated between Sharon and Sharpsville. The old stack, which was 14 x 16 ft., has been torn down and a somewhat larger one will be erected. It will be about two months before the furnace is ready to go into blast again. New machinery and appliances are to be installed. The furnace has been in continuous blast since 1901.

At the furnaces of the Crane Iron Works, Catsauqua, Pa., Harry R. Hall, superintendent, some record outputs have been made in recent months. The furnace of the company running on low phosphorus iron broke its record of production three times in four months. The No. 3 furnace producing foundry iron recently reached an output of 165 tons, and in a week produced 1060 tons of No. 1 iron on regular ore charges. Two blowing engines are being dismantled, and two engines furnished by the Southwark Foundry & Machine Company, Philadelphia, are being installed.

General Machinery.

The Colburn Machine Tool Company, Franklin, Pa., has built an addition to its plant, 30 x 60 ft., which will be used as a pattern shop, the building formerly used for this purpose now being operated as a machine shop.

The Climax Mfg. Company, Corry, Pa., has just installed a line of electric and pneumatic machinery for the manufacture of geared locomotives for lumber and other lines of business requiring this kind of locomotive. The company has also installed two 30-ton electric cranes.

The Wetmore Mfg. Company, Galesburg, Ill., has been incorporated, with a capital stock of \$2500, by George E. Wetmore, T. L. Wetmore, G. A. Smith and A. L. Moser, for the purpose of manufacturing tools and machinery.

The Pittsburgh Bridge & Iron Works, Pittsburgh, which has the contract for the erection of the steel buildings for the new plant of the American Roll & Foundry Company at Canton, Ohio, expects to have these buildings completed within the time specified in the contract, which is December 10. The structural steel is being delivered promptly and the buildings are now well under way. It is expected that the plant of the American Roll & Foundry Company will be completed and in operation some time in January. The foundry and machine shops will be modern in all details, a large amount of labor saving equipment being installed.

The following are the officers of the Albany Forge Company, Albany, N. Y., manufacturer of forgings of every description:

Robert C. Pruyn, president; Charles M. Hyatt, vice-president; Franklin Townsend, secretary and treasurer; Thomas Prentice, manager.

The Krahn Mfg. Company, Milwaukee, Wis., has been incorporated, with a capital of \$6000, by A. W. Krahn, A. M. Hess and L. G. Wheeler. It will be an extension of the business heretofore conducted by A. W. Krahn at 573 East Water street for the manufacture of machinery and tools.

The B. F. Sturtevant Company, Hyde Park, Mass., is installing its heating and ventilating systems in a large number of industrial plants, including Federal Lead Company, Platt River, Mo.; Detrick & Harvey Machine Company, Baltimore, Md.; Sloan & Chase Mfg. Company, Newark, N. J.; Cambria Steel Company, Johnstown, Pa.; Houston, Stanwood & Gamble Company, Covington, Ky.; Maine Central Railroad Company, Waterville and Portland, Maine; United Shoe Machinery Company, Beverly, Mass.; Reed & Barton, Taunton, Mass., and National Malleable Castings Company, Cleveland, Ohio.

Power Plant Equipment.

The Booker Sheet Metal Works, Oil City, Pa., is installing a blast pipe system at the Edgar Thomson Steel Works of the Carnegie Steel Company, at Bessemer, Pa.

The United Pump & Power Company, Chicago, has been incorporated with a capital stock of \$100,000, by John M. Swanson, James A. Townsend and Perry A. Thompson. The product will consist of pneumatic water systems on which patents are owned, including air compressors, engines, electric motors, windmills and pneumatic water pumps. The company is located at 413 Dearborn street.

The Platt Iron Works, Dayton, Ohio, has received the contract at \$15,575 for installing a new horizontal pumping engine of 6,000,000 gal. capacity at the city water works, Decatur, Ill.

Recent sales of the Crocker-Wheeler Company, Ampere, N. J., include the following: De Laval Steam Turbine Company, Trenton, N. J., two 100-kw. generators; National Tube Company, McKeesport, Pa., one 1000-kw. generator; H. K. Judd Company, Wallingford, Conn., one 225-hp. generator and 22 direct current motors from 2 to 50 hp.; Southern Railroad, Nashville, Tenn., three transformers.

The Westinghouse Machine Company, Pittsburgh, Pa., has an order for the Philadelphia Rapid Transit Company's Wyoming avenue power station for three turbine generator units, each of 6000 kw. capacity, which, with the one now in course of erection, will make four units of 6000 kw. capacity each in this station. Six 1500 kw. Westinghouse turbine generator units have been operating in this station for the past year, and it is their extremely satisfactory performance that led to the placing of the order for the four 6000 kw. units, making this one of the largest power stations in the country.

The following is a partial list of gas plants with fuel equipment installations upon which the Industrial Gas Company, New York, is at work at present: Complete rolling mill and entire furnace equipment, steel castings plant with 20-ton open hearth furnace, continuous billet heating furnace, annealing and auxiliary equipment for the Ontario Iron & Steel Company, Welland, Ontario; complete steel plant, with Bessemer side blow converter and auxiliary equipment, El Paso Foundry & Machine Company, El Paso, Texas; side blow converter steel castings plant, Penn Steel Castings Company, Chester, Pa.; two Herrick gas producers and auxiliary equipment, Acme Steel & Malleable Company, Buffalo, N. Y.; the first of ten gas fired forging furnaces, with Herrick gas producers and auxiliary equipment, Sizer Forge Company, Buffalo, N. Y.; muffle enameling furnaces, with Herrick gas producer and auxiliary equipment, Republic Metal Ware Company, Buffalo, N. Y.; 225-hp. Harvey anthracite producer, George N. Pierce Company, Buffalo, N. Y.; Acme gas plant for supplying gas for case hardening and annealing furnaces of Buick Motor Company and Weston-Mott Company, Flint, Mich.; Acme gas plant for supplying gas for melting and blowpipe work, Franklin Electric Mfg. Company, Hartford, Conn.; Herrick producer gas valves, American Tube & Stamping Company, Bridgeport, Conn., and Chambersburg Engineering Company, Chambersburg, Pa.

The Bortreager Gas Engine Company, Pittsburgh, has applied for a charter. The company now operates a plant for the manufacture of gas engines at Murtland and Highland avenues, Pittsburgh.

The New York Securities Company, recently incorporated at Buffalo, N. Y., with a capital of \$2,500,000, has taken over the charter of the Economic Power & Construction Company, granted in 1893, with rights to lay transmission tubes for electric power and lighting, telephones and steam heating and refrigeration. It is the purpose of the company to operate in Buffalo a system of heat, power and light distribution from central stations which it will build.

Announcement has been made of the formation of the Electric Operating Construction Company, 49 Wall street, New York. It has been formed with a New York charter, to construct and manage electric properties, especially in the line of power and railroad developments. The members of the company are A. D. Bowen, R. S. Masson and F. S. Vile.

Foundries.

The report that the Youngstown Foundry & Machine Company, Youngstown, Ohio, would purchase a large site of land near its present works to be used for the building of a new plant is denied by the company, which states that it has no plans under way at present for new works or extensions to its present plant.

According to the prospectus just issued, the Bessemer Steel Casting Company, Bessemer, Ala., is to have a capital stock of \$150,000 and is to erect a plant for the manufacture of open hearth steel castings, the site for which has been selected. The plant will have a capacity of from 75 to 100 tons per day. Those interested are G. P. Martin and Lee Moody of Bessemer; H. L. Badham, president, and James Bowron, vice-president, of the Bessemer Coal, Iron & Land Company, and G. H. Stevenson, president of the Board of Trade of Bessemer.

The Hoquiam Machine Works, Frank H. Lamb, proprietor, Hoquiam, Wash., has decided to erect a foundry in connection with its plant. The building will be 40 x 80 ft., two stories high, and will be adapted for special iron castings for logging purposes.

John Seaton, Atchison, Kan., is building an addition to his foundry, which will be equipped with electric power for the handling of heavy castings. The addition will provide accommodations for 15 additional molders.

The plant of the Lakeside Malleable Castings Company, Racine, Wis., will shortly be enlarged to double its present capacity. Two foundries will be added, each 70 x 160 ft., and an addition will be made to the annealing department, 55 x 160 ft. A new office building will be erected, and when the improvements are completed employment will be given to about 500 men.

The Baltimore Railway Specialty Company, which controls the Baltimore ball, center and side bearings, has recently completed a modern malleable iron foundry for the manufacture of malleable castings required in connection with its bearings. This plant is located at Corning, N. Y., adjacent to one of the large plants of the T. H. Symington Company, the offices of the two companies being practically identical. This malleable foundry, which is now in full operation, will also take care of the malleable requirements of the T. H. Symington Company and probably take on other additional malleable iron work.

The Williamson Mfg. Company, Bradford, Pa., has increased its capital stock from \$50,000 to \$75,000, and will erect a new foundry at its plant in East Bradford.

Fires.

The Bapec Machine Works, Lima, N. Y., were damaged \$20,000 by fire November 13.

The plant of the American Cutlery Company, Chicago, Ill., was destroyed by fire November 14. The loss is placed at \$500,000.

The foundry and pattern storehouse of the Capital Iron Works, Topeka, Kan., were damaged \$10,000 by fire November 13.

The plant of the Atlantic Insulated Wire & Cable Company, at Stamford, Conn., was burned November 15, the loss being over \$100,000.

The plant of the Standard Chair Company, Corry, Pa., was destroyed by fire November 15, the loss being close to \$100,000.

The building containing the jewelry factories of the W. H. Wilmarth Company and the P. J. Cummings Company, Attleboro, Mass., was destroyed by fire November 20, with loss of \$100,000.

Hardware.

The Niagara Cordage Company, manufacturer of hard fiber rope, Buffalo, N. Y., which has been in existence about a year, has been favored with so much business that it has become necessary to build a new plant. This is now in course of erection at North Tonawanda, N. Y. The new plant will be ready for occupancy within six weeks, and the company will then be in excellent position to meet the requirements of its customers.

The Pittsburgh Automatic Vise & Tool Company, Pittsburgh, which manufactures the Pittsburgh vise, is having a heavy demand for these tools and is back several months in deliveries in spite of the fact that it has recently materially increased its capacity.

The A. J. Smart Mfg. Company, Greenfield, Mass., has been incorporated in Massachusetts to manufacture taps and dies. The officers are: President and treasurer, A. J. Smart; vice-president, R. S. Bascom, and secretary, R. H. Smart. The company proposes to build a factory in the vicinity of Greenfield within a year or so, and will prepare to make tools and special machinery for the manufacture of taps and dies.

The Wallace Barnes Company, Bristol, Conn., manufacturer of small springs of all descriptions, has nearly completed its new factory building, which will give 24,000 sq. ft. of additional floor space. New machinery, together with the rearrangement of that already in operation, will enable the company to take on heavier work. Its automobile spring department will be doubled, additional capacity being necessary because of the

rapidly increasing demand for valve, clutch and lever springs, &c., all of which are made to specifications. Machinery for the manufacture of screw machine products up to 1 in. in diameter will be installed, enabling customers to centralize their purchases.

B. A. Marshall, Cumberland Mills, Maine, manufacturer of shovel handles, will erect an addition to his works, consisting of a two-story building, 40 x 53 ft. The demand for his product has been so great that additional manufacturing capacity has become necessary. The boiler capacity will also be increased. With the enlargement the works will have a weekly capacity of 1000 dozen shovel handles.

A meeting of the Board of Directors of the American Shear & Knife Company, Hotchkissville, Conn., was held last week, at which H. S. Dormitzer was elected treasurer, vice H. J. Mason, resigned, and Samuel M. Hitchcock, attorney at law, was elected a director, succeeding Mr. Mason.

Hawkeye Incubator Company, Newton, Iowa, has recently completed and is now operating a new factory, replacing that destroyed by fire about a year ago. The company states that its new equipment is first-class in every respect and enables it to turn out a product of the highest grade. It reports a splendid trade on its One Minute washers and refers to indications that an enlargement of plant will be necessary in the near future.

The Penn Shovel Mfg. Company, Warren, Ohio, and the Hanna & Young Handle Company, Poplar Bluff, Mo., have been consolidated. As a result the plant of the shovel company will be greatly enlarged by additions in the way of a handle plant and a rolling mill, while the shovel capacity will also be materially increased. The Penn Shovel Mfg. Company has increased its capital stock \$200,000, making a total of \$350,000. The rolling mill will be the largest addition to the plant. It is the intention of the company to erect a mill for the manufacture of the steel and iron used in the shovel business and it will have an output of 50 tons a day. The shovel factory will be enlarged so as to increase its output to 75,000 or 80,000 dozen a year. The handle plant will be located in what is known as the old machine shop on the Penn Company's property. This building is 42 x 140 ft.

Miscellaneous.

The Union Metal Post Company has been organized at Canton, Ohio, to manufacture porch columns, newels and porch trimmings, mostly from sheet metal. These will be made in new designs and will be furnished at a moderate cost. The columns and the machines for making them are to be made by the company. It will not be ready to place orders for its regular line of machinery until the special machines for making the columns are well under way. This is an entirely new field for the use of sheet metal, this being the first company, we are advised, to make these goods from this material.

At Newell, W. Va., a new town on the Ohio River, opposite East Liverpool, Ohio, the North American Mfg. Company is constructing several new buildings to be used as a pottery plant. The H. W. Johns-Manville Company, New York, has secured the contract for covering the buildings of nearly the entire plant, taking several thousand squares, with its J M asbestos roofings. About 20 different manufacturers of roofings were keenly competing for this contract, and it was only after exhaustive tests that the contract was awarded.

The Seneca Chain Company, Kent, Ohio, has been successful bidders on the Government contract for the light vessel chains for the year 1907. As this contract will amount to approximately \$40,000, it is quite a large order for chain. This company had the contract for all of the light vessel chain for the Light House Department for the past year, which contract it has completed. The company has just secured an order for 3¼-in. chain for the Edison Engineering Company, New York, which is the largest chain ever made in this country. It is also making chains for the Newport News Ship Building Company, Newport News, Va., and heavy cables for the Union Iron Works, San Francisco, as well as for two vessels being built at Aberdeen, Wash.

The Bryan, Marsh Company, New York, manufacturer of incandescent electric lamps, has purchased the Farwell Worsted Company mills at Central Falls, R. I., and will equip them for a branch of the Marlboro Electric Machine & Lamp Company, Marlboro, Mass., which is the Bryan, Marsh Company's manufacturing corporation. The Central Falls plant is a large one and has both steam and water power. Some 500 hands will be employed. The company will be in the market for very little new equipment. The power plant is ample, and only special machinery is used, built by the company at the Cleveland machine shop, Cleveland, Ohio. The inadequacy of the Marlboro factory and the imperative need of new manufacturing space caused the purchase of the Central Falls property instead of the building of a new factory.

George A. Smith, formerly a member of the firm of Wilson & Smith, Worcester, Mass., has formed a partnership with William H. Stearns, under the firm name of Smith & Stearns, for the manufacture of cold metal stamping and die work. Mr. Stearns established the business at 17 Hermon street some nine months ago, and the firm will continue it in a larger way. Both partners have had a wide experience in the manufacture of this class of products.

The International Paper Company is to build two large manufacturing buildings at Rumford Falls, Maine, to cost \$100,000.

The shipyard of E. & I. K. Stetson, Bangor, Maine, has been sold to John T. Bowler and George H. Hamlin. The new owners have also purchased a large pier adjacent to the shipyard. It is stated that important improvements of the property are contemplated.

The Pittsburgh Gage & Supply Company, Pittsburgh, Pa., is installing a large number of White Star continuous oiling systems in various plants, including those of the Brier Hill Iron & Coal Company, Youngstown, Ohio; Embree Iron Company, Embreeville, Tenn.; Bullock Electrical Mfg. Company, East Norwood, Ohio; Sargent & Co., New Haven, Conn.; National Car Wheel Company, West Homestead, Pa.; Copper Queen Consolidated Mining Company, Douglas, Ariz.; Brush Electric Light & Power Company, Galveston, Texas; Illinois Steel Company, Joliet, Ill.; Consolidated Gas, Fuel, Light & Power Company, Baltimore, Md.

James Ackroyd & Son, Albany, N. Y., manufacturers of skylights and architectural sheet metal work, have purchased a plot of ground on Broadway, where they will erect a new building, which will be equipped with the most improved machinery, specifications for which have not yet been prepared.

The Ladewig & Stock Company, Waukesha, Wis., recently incorporated with a capital stock of \$25,000, succeeds W. E. Ladewig. The business will be conducted on the same lines as formerly but will be enlarged. For the present a specialty will be made of the manufacture of bottle soaking machinery. The officers of the new company are: President, W. E. Ladewig; vice-president, Wm. F. Ladewig; secretary, Henry F. Stock, and treasurer, W. E. Ladewig.

The Electric Heating & Mfg. Company, Incorporated, Los Angeles, Cal., has purchased land near Dolgeville, Cal., for the purpose of erecting a factory for the manufacturing of electric heating and cooking devices of various kinds.

J. H. Wagenhorst & Co., Youngstown, Ohio, manufacturers of electric blue printing machines, have recently received an order from England for a machine to make two prints at a time, 42 x 60 in. The firm is in receipt of inquiries from almost every part of the world, including South America and China.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, owns considerable acreage of coal lands in Green County, Pa., and has placed contracts for the building of 1000 coke ovens on the property.

The Boston & Maine Railroad has placed an order with the Union Switch & Signal Company, Pittsburgh, Pa., for automatic block signals to cover at least 1000 miles of track. The work involves an expenditure of several hundred thousand dollars and is said to be one of the largest single contracts for automatic block signals that has ever been placed.

The Continental Can Company, Syracuse, N. Y., intends to install a new plant at Baltimore, Md.

The Spencer Kellogg Company, Buffalo, N. Y., intends to build a large linseed oil mill at Minneapolis, Minn., the site for which has not yet been selected. The mill will have 48 presses and will have about one-third the capacity of the company's plant at Buffalo. The investment will amount to several hundred thousand dollars.

The Buffalo plant of the General Railway Signal Company has been sold to the Century Telephone Construction Company, Buffalo, whose factory in that city was recently destroyed by fire. In consequence of this sale the General Railway Signal Company will concentrate its entire manufacturing plant at Lincoln Park, Rochester, where its pneumatic signal department is already located. Contracts have been let for the construction at that point of two new factory buildings, one of 30,000 sq. ft. and one of 7000 sq. ft., besides an office building. The transfer of the machinery of the Buffalo plant and the executive offices of the company will be made to Rochester upon the completion of these new buildings.

The Cataract Engineering Company, recently incorporated at Niagara Falls, N. Y., will build a large plant in that city for the manufacture of patent locks and specialties.

The name of the Buffalo Aluminum Company has been changed to the National Aluminum Works, and the plant will be moved to Wellsville, N. Y.

Buffalo's Outer Harbor to be Utilized.—After years of fruitless litigation respecting the title to the Hamburg turnpike and "Sea-wall strip," running along the shore of Lake Erie at Buffalo, and contiguous lands, a definite and satisfactory agreement was reached at a final conference between officials and attorneys of the railroad companies centering at Buffalo who are owners of water front lands, and representatives of the municipality of Buffalo and private ownership interests, which was held at the residence of Mayor Adam November 14, and the

way is now open for the improvement of the new outer harbor. By the agreement made, the city of Buffalo secures title to a highway 80 ft. wide and $4\frac{1}{2}$ miles in length along the water front, from the foot of Main street to the Lackawanna Steel Company's plant at Stony Point, besides 1000 ft. of dockage and other property; and the railroads, who own the greater percentage of the entire water frontage, gain a clear title to the land outside of the highway, and a franchise for connecting tracks along the entire frontage. This means that the outer harbor, which is protected by a stone breakwater 5 miles in length, built by the United States Government at a cost of over \$5,000,000, will now be utilized, it having been comparatively unused since the completion of the breakwater, pending this adjustment of titles. It was announced at the conference that fully \$50,000,000 is to be expended by the railroad companies and other interests in the construction of wharves, freight houses, elevators, coal and ore docks, loading and unloading apparatus, and in connecting tracks and terminal facilities. Plans for many of these have already been made, only awaiting clear title to the land which is to be improved.

Asbestos in Building Construction.

The silky fiber of asbestos enables it to be manipulated into any form. It is further a natural heat insulator, is not affected by any extremes of weather conditions, is absolutely fireproof and is not expensive. Taking advantage of these properties, the H. W. Johns-Manville Company, 100 William street, New York, has shown great ingenuity and enterprise in developing various lines of asbestos building materials which are noteworthy, as their use begins at the foundation of a residence building and extends throughout it to the roof, as follows:

After the first-floor joists are put in place J-M Asbestos plaster can be used in conjunction with either wood or metal lathing as a "scratch" coat on the ceiling of the cellar. Thus used, it offers a positive fire barrier between floors and is claimed to present the most satisfactory form of plastering known. Between all floors and between the outside boarding and clapboards the use of J-M asbestos sheathing papers and asbestos sheathing quilts has met with great favor, having many advantages over other products, owing to their natural fire resisting properties. They not only prevent the transmission of sound waves between rooms but effect a saving in fuel of large proportions when placed upon the side walls. These felts are also used on roofs, under shingles and slates, and insure a comfortable building throughout the entire year. J-M Asbestos plaster is used for inside plastering and it is claimed that it will not fall off or crack, even if the floors above are flooded. It is also very desirable for stucco work. It can be applied as readily as any of the hard plasters, is light in weight and insures practically fireproof rooms. It can be finished in such a manner that decorations can be made equal to those on canvas. Transite asbestos fireproof lumber can be used for moldings, casings, wainscoting, fireproof partitions, &c. This material, the body of which is asbestos fiber, is a strong fire resisting building lumber. It can be worked in very much the same manner as wood and can be painted or grained to match the best of hardwoods, such as oak, mahogany, &c. J-M Transite asbestos fireproof slates have been found to be an economical roof covering. They secure at a moderate cost the highest degree of insulating value. They are readily sawed or nailed and can be worked into any desirable shape, thus making them more easy to apply than ordinary slate or tile. Owing to their natural insulating properties they are not affected by the severest weather conditions. Coming to the heating apparatus, Asbestocel paper, J-M asbestos and magnesia pipe coverings and plastic cement are used for covering furnaces, pipes and boilers to insure the delivery of maximum heat to the rooms to be heated. Thus the company's products as applied to the building of a house tend to make it more easily heated and to reduce the quantity of fuel burned for that purpose.

The Iron and Metal Trades

There are cross currents in the Iron Ore market. The leading sellers of Lake Ores have booked orders for the full output of their standard grades for the season of 1907-1908, and in the case of certain Bessemer grades some premiums over the prices recently established have been asked and paid.

On the other hand, a considerable number of Eastern furnaces and important Pig Iron producing interests of the Central West have declined to buy as far ahead as the early summer of 1908, on the ground that the prices demanded are so high that they cannot take the risk of any serious decline in Pig Iron, which might develop between the summer of 1907 and beginning of new Ore shipments in 1908.

The Eastern Pig Iron markets continue quite active, the sales including a number of good lots of Gray Forge in central and eastern Pennsylvania and one lot of 10,000 tons of Basic Pig at \$23, delivered.

The markets for domestic and foreign Foundry Iron are stiffened; both are reaching forward more as to deliveries, and the spot demand remains keen in spite of the very high prices. Scotch and Middlesbrough Irons are both higher.

There is some inquiry for Southern Pig Iron for delivery during the third quarter, but it is not taken seriously by sellers.

Steel continues very scarce and is stiffening in price. Some good orders have been entered for Steel Rails, including 25,000 tons for the Atlantic Coast Line, 18,000 tons for the Gainesville & Gulf, and 5000 tons additional for the Texas & Pacific Road. It is noted that an unusual number of roads are adding to their earlier requirements for 1907.

The fact that Chicago fabricators of Structural Material have placed contracts for about 25,000 tons of Shapes for delivery during the first half of 1907 at current prices is interpreted as indicating that an advance may be in sight. Generally speaking, however, the structural mills are not crowded with work. During the past week contracts for Buildings and Bridges were given out in the Chicago district which aggregate 10,000 tons. The constituent companies of the Steel Corporation have placed orders for 14,000 tons of fabricated work for new construction.

The advance of \$2 per ton on Plates by Eastern mills foreshadows an early advance in the official price. The Eastern mills are facing rising costs, and foresee full employment for their plants well into the spring.

There has been a heavy business in Steel Bars during the past week, distributors, railroads and manufacturers of Shaped Bars for reinforced concrete being the purchasers, in some instances in anticipation of the advance of \$2 per ton which was decreed on the 15th. Merchant Steel values have also been readjusted.

The Pipe contract for the line from the Indian Territory oil fields to the Gulf, taken by the National Tube Company, involves upward of 30,000 tons.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Nov. 21, Nov. 14, Oct. 24, Nov. 12,
1906. 1906. 1906. 1905.

PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	\$23.75	\$23.50	\$21.50	\$18.25
Foundry No. 2, Southern, Cincinnati	25.00	25.00	20.50	16.75
Foundry No. 2, Local, Chicago	25.50	24.50	22.00	19.50
Bessemer, Pittsburgh	22.85	22.85	20.85	18.10
Gray Forge, Pittsburgh	22.85	22.85	19.85	16.75
Lake Superior Charcoal, Chicago	25.50	23.50	22.00	19.50

BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	29.50	28.50	28.00	26.00
Forging Billets, Pittsburgh	36.50	36.00	35.00	30.00
Open Hearth Billets, Phila.	33.00	33.00	32.00	30.00
Wire Rods, Pittsburgh	37.00	35.00	35.00	32.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:				
O. Steel Rails, Chicago	20.50	20.50	18.50	16.50
O. Steel Rails, Philadelphia	19.50	19.50	18.50	18.25
O. Iron Rails, Chicago	28.00	28.00	26.50	23.00
O. Iron Rails, Philadelphia	26.50	26.00	25.50	24.00
O. Car Wheels, Chicago	23.00	23.00	20.00	18.00
O. Car Wheels, Philadelphia	22.50	21.50	21.50	17.00
Heavy Steel Scrap, Pittsburgh	18.50	17.50	16.75	18.00
Heavy Steel Scrap, Chicago	17.50	17.50	16.50	15.25

FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.83½	1.83½	1.83½	1.83½
Common Iron Bars, Chicago	1.71½	1.71½	1.71½	1.85
Common Iron Bars, Pittsburgh	1.80	1.80	1.60	1.80
Steel Bars, Tidewater, New York	1.74½	1.64½	1.64½	1.64½
Steel Bars, Pittsburgh	1.60	1.50	1.50	1.50
Tank Plates, Tidewater, New York	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.65	1.57½	1.57½	1.55
Skelp, Sheared Steel, Pittsburgh	1.70	1.60	1.60	1.65

SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.40	2.20
Wire Nails, Pittsburgh	1.90	1.90	1.85	1.80
Cut Nails, Pittsburgh	1.95	1.95	1.90	1.65
Barb Wire, Galv., Pittsburgh	2.35	2.35	2.30	2.25

METALS, Per Pound:				
Cents.	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	22.50	22.50	22.25	17.00
Spelter, St. Louis	6.25	6.35	6.20	6.00
Lead, New York	6.05	6.00	5.90	5.70
Lead, St. Louis	5.87½	5.90	5.90	5.50
Tin, New York	42.70	42.65	43.25	33.60
Antimony, Hallett, New York	25.00	25.00	25.00	12.25
Nickel, New York	45.00	45.00	45.00	40.00
Tin Plate, Domestic, Bessemer, 100 lb., New York	\$4.00	\$4.00	\$3.94	\$3.50

Chicago.

FISHER BUILDING, November 21, 1906.—(By Telegraph.)

The advance of \$2 a ton on Steel Bars and Merchant Steel products generally, which became effective last Thursday, is believed by the trade to be the forerunner of further advances on finished commodities, and the heavy buying of Structural Shapes for future requirements, by local fabricators, is indicative of an early advance in the price of this class of material. Two Eastern mills are already asking \$2 above the association price on Plates for early delivery, Western mills being unable to make shipments in less than three months. Contracts for Shapes placed by Structural fitters for first half delivery aggregate 25,000 tons, while contracts for bridges and buildings reach a total of 10,000 tons additional. An increase in the volume of Shape specifications is likewise reported by the Illinois Steel Company, and a pronounced improvement in the Structural situation generally is noted. The tonnage of all classes of finished products on order books is practically unchanged and covers the output for three months. Recent heavy buying of Iron Bars has not materially improved prices, and the local market is still on a basis of 1.55c., Pittsburgh. Western roads continue to add to their rolling stock, bids having been asked the past 10 days for approximately 10,000 Steel and wooden cars.

Pig Iron.—Transactions in Foundry grades continue to be limited to car lots for immediate needs, founders being unwilling to pay the prices that are prevailing, except to tide over emergencies. In view of the comparatively low prices ruling for castings, the temporary closing down of

foundries has been considered rather than to incur the losses sustained through continued operations on high priced raw material. While occasional sales of No. 2 in other districts have been made at \$25, Birmingham, the highest price asked by local merchants is \$22, and efforts are being made to prevent further advances. Only an occasional car of Northern Iron is offered, and asking prices for No. 2 range from \$25.50 to \$26.50, and practically the same quotations are ruling on Lake Superior Charcoal grades. For first half delivery Southern operators are asking 25c. less on the softer grades, which is undoubtedly due to the heavy future sales of the strong Irons. For shipment through the first quarter of the year, quotations, f.o.b. Chicago, are as follows:

Lake Superior Charcoal.....	\$25.50 to \$26.50
Northern Coke Foundry, No. 1.....	26.00 to 27.00
Northern Coke Foundry, No. 2.....	25.50 to 26.50
Northern Coke Foundry, No. 3.....	25.00 to 26.00
Northern Scotch, No. 1.....	26.00 to 27.00
Ohio Strong Softeners, No. 1.....	25.30 to 26.30
Ohio Strong Softeners, No. 2.....	24.80 to 25.30
Southern Coke, No. 1.....	25.40 to 25.90
Southern Coke, No. 2.....	24.90 to 25.40
Southern Coke, No. 3.....	24.40 to 24.90
Southern Coke, No. 4.....	23.90 to 24.40
Southern Coke, No. 1 Soft.....	25.40 to 25.90
Southern Coke, No. 2 Soft.....	24.90 to 25.40
Southern Gray Forge.....	22.40 to 22.90
Southern Mottled.....	21.90 to 22.40
Malleable Bessemer.....	24.30 to 25.30
Standard Bessemer.....	24.80 to 25.80
Jackson Co. and Kentucky Silvery, 6 %	27.30 to 27.80
Jackson Co. and Kentucky Silvery, 8 %	29.30 to 29.80
Jackson Co. and Kentucky Silvery, 10 %	31.30 to 31.80

Metals.—Another advance of 10c. on Sheet Zinc became effective November 17, establishing a list of \$8, Peru or La Salle, in car lots of 600-lb. casks. Copper maintains its strength, and there have been still further advances in Old Metals. We quote: Casting Copper, 23½c. to 24½c.; Lake, 24c. to 24½c., in car lots for prompt shipment; small lots, ¼c. to ¾c. higher; Pig Tin, car lots, 45½c.; small lots, 45½c. to 46c.; Lead, Desilverized, 6.05c. to 6.15c., for 50-ton lots; Corroding, 6.75c. to 6.85c. for 50-ton lots; on car lots, 2¼c. per 100 lb. higher; Cookson's Antimony, 23½c., and other grades, 26½c. to 27½c.; Sheet Zinc is \$8 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 18½c.; Heavy Copper, 18½c.; Copper Bottoms, 17½c.; Copper Clips, 18c.; Red Brass, 18c.; Red Brass Borings, 14½c.; Yellow Brass, 13½c.; Yellow Brass Borings, 12½c.; Light Brass, 11½c.; Lead Pipe, 5.40c.; Tea Lead, 5c.; Zinc, 5c.; Pewter, No. 1, 26c.; Tin Foil, 34c.; Block Tin Pipe, 27½c.

Old Material.—Relaying Rails continue exceedingly scarce and small lots of Heavy Sections have sold as high as \$34 per gross ton, although in large lots this price is shaded from \$2 to \$3 a ton. The inability of the Rail mills to make shipments of small lots for immediate needs has resulted in this abnormal demand for Relayers, and not until the mills can make better deliveries will the demand for Old Rails subside. No. 1 Wrought has declined slightly owing to the heavy offerings by local dealers, although all grades of Cast are in heavy demand and prices continue to advance. The Chicago, Milwaukee & St. Paul Railroad this week disposed of a small lot of Scrap, and the Chicago, Burlington & Quincy has issued a list covering 2000 tons. The quotations on Relaying Rails given below are on sections of 50-lb. and over. Quotations on gross tons, car lots, f.o.b. Chicago, are as follows:

Old Iron Rails.....	\$28.00 to \$29.00
Old Steel Rails, 4 ft. and over.....	21.50 to 22.00
Old Steel Rails, less than 4 ft.....	20.50 to 21.00
Heavy Relaying Rails, subject to inspection, 50 lb. and under.....	29.00 to 31.00
Old Car Wheels.....	23.00 to 23.50
Heavy Melting Steel Scrap.....	17.50 to 18.00
Frogs, Switches and Guards.....	18.00 to 18.50
Mixed Steel.....	15.00 to 15.50

The following quotations are per net ton:

Iron Fish Plates.....	\$23.00 to \$23.50
Iron Car Axles.....	27.50 to 28.00
Steel Car Axles.....	23.50 to 24.00
No. 1 Railroad Wrought.....	17.50 to 18.00
No. 2 Railroad Wrought.....	16.50 to 17.00
Railway Springs.....	16.00 to 16.50
Locomotive Tires, smooth.....	16.00 to 16.50
No. 1 Dealers' Forge.....	13.50 to 14.00
Mixed Buses.....	11.50 to 12.00
Iron Axle Turnings.....	11.00 to 11.50
Soft Steel Axle Turnings.....	11.00 to 11.50
Machine Shop Turnings.....	11.00 to 11.50
Cast Borings.....	9.00 to 9.50
Mixed Borings, &c.....	9.00 to 9.50
No. 1 Mill.....	10.50 to 11.00
No. 2 Mill.....	9.50 to 10.00
No. 1 Boilers, cut to Sheets and Rings.....	12.50 to 13.00
No. 1 Cast Scrap.....	17.50 to 18.00
Stove Plate and Light Cast Scrap.....	14.00 to 14.50
Railroad Malleable.....	18.00 to 18.50
Agricultural Malleable.....	17.00 to 17.50

(By Mail.)

Billets and Rods.—We note the sale of 1800 tons of Forging Billets for forward delivery on a basis of practically \$40, Chicago. A small tonnage of Rods for early shipment has been offered in this market at \$38, but no sales have as yet been reported at this price.

Rails and Track Supplies.—From present indications the Illinois Steel Company will carry over into next year

at least 200,000 tons of Standard Section Rails, in addition to its 1907 tonnage, although the December output will be a large factor in determining this total. The demand for Light Rails continues heavy, although local mills have not as yet followed the recent advance of the Carnegie Steel Company. Quotations are unchanged, as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50c.; car-load lots, 1.75c.; Spikes, 2.25c. to 2.50c., according to delivery; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$32; 25-lb., \$33; 20-lb., \$34; 16-lb., \$35; 12-lb., \$36, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—Contracts for Shapes aggregating 25,000 tons have been placed by local fabricators with both the Illinois and Carnegie Steel companies for delivery during the first half of next year. Awards of approximately 10,000 tons of Steel for bridges and buildings were made as follows: Heyworth Building, Chicago, 2500 tons, Brown-Ketcham Iron Works, Indianapolis; Sprague-Warner Building, Chicago, 1000 tons, Moore Building, San Francisco, 1500 tons, Atlantic Portland Cement Company, Nazareth, Pa., 2800 tons, bridge at Everett, Wash., 300 tons, and 200 tons for the Indiana Steel Company, Gary, Ind., were placed with the American Bridge Company. The Rock Island system divided close to 4000 tons among a number of fabricators, and another Western road is asking bids on 4000 to 5000 tons for 1907 shipment. Local warehouses continue to quote 2.05c. to 2.10c., while mill prices are unchanged, as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.90½c.; Beams, larger than 15 in., 1.90½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—An early advance is anticipated by the trade, owing to the general upward tendency of the market, two Eastern mills having already taken the initiative, advancing prices for early delivery \$2 per ton. Local mills are unable to make shipments in less than two or three months, although Eastern makers are better situated and can ship in as many weeks. Quotations are as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 in., 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 in., 1.86½c.; base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in., up to 60 in. wide, 2.10c. to 2.20c.; 72 in. wide, 2.35c. to 2.45c.; No. 8 up to 60 in. wide, 2.15c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—There has been a falling off in the demand for both Black and Galvanized Sheets, although specifications on existing contracts show no decline. Local distributors report heavy sales from stock and experience much difficulty in maintaining an assortment of sizes and gauges. We quote: Blue Annealed, No. 10, 1.96½c.; No. 12, 2.01½c.; No. 14, 2.06½c.; No. 16, 2.16½c.; Box Annealed, Nos. 17 to 21, 2.51½c.; Nos. 22 to 24, 8.56½c.; Nos. 25 and 26, 2.61½c.; No. 27, 2.66½c.; No. 28, 2.76½c.; No. 29, 2.86½c.; No. 30, 2.96½c.; Galvanized Sheets, Nos. 10 to 14, 2.71½c.; Nos. 15 and 16, 2.91½c.; Nos. 17 to 21, 3.06½c.; Nos. 22 to 24, 3.21½c.; Nos. 25 to 26, 3.41½c.; No. 27, 3.61½c.; No. 28, 3.81½c.; No. 30, 4.31½c. Sheets from store, Blue Annealed, No. 12, 2.25c.; No. 14, 2.30c.; No. 16, 2.40c.; Box Annealed, Nos. 18 to 21, 2.70c.; Nos. 22 to 24, 2.75c.; No. 26, 2.80c.; No. 27, 2.85c.; No. 28, 2.95c.; No. 30, 3.35c.; Galvanized from store, Nos. 10 to 20, 3.20c. to 3.25c.; Nos. 22 to 24, 3.45c. to 3.50c.; No. 26, 3.55c. to 3.60c.; No. 27, 3.65c. to 3.85c.; No. 28, 4.00c.; No. 30, 4.55c. to 4.60c.

Bars.—At a meeting of the Steel Bar manufacturers, held last week, Steel Bars were advanced \$2 a ton, effective November 15. This covers the entire Bar card and includes Bands as well. Before this advance was made all the local distributors were let in on the 1.50c. basis, and inasmuch as all large consumers are covered to July 1, next year, at prices from \$2 to \$4 a ton below the new basis, only a comparatively small tonnage will be affected. Iron Bars have not materially gained in strength, and are still to be had on the basis of 1.55c. Pittsburgh. The Great Northern has purchased 1000 tons at this price, while an Illinois car works took on 4000 tons. Quotations are revised as follows: Iron Bars, 1.71½c. to 1.76½c.; Steel Bars, 1.76½c., both half extras; Hoops, 2.16½c., extras as per Hoop card; Bands, 1.76½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 1.95c. to 2.05c., half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—Buying for spot shipment continues heavy, and occasional premiums are offered on sizes that are exceptionally scarce. Discounts on car lots, Chicago, are as

follows: Black Steel Pipe, 77.35, on the base sizes, $\frac{3}{4}$ to 6 in., and Galvanized, 67.35. From store in small lots Chicago jobbers quote 74 $\frac{1}{2}$ to 75 per cent. on Black Steel Pipe, $\frac{3}{4}$ to 6 in. Iron Pipe is held at an advance of 4 to 5 points above these prices.

Boiler Tubes.—Large consumers are buying freely in anticipation of an early advance, although this is a remote possibility, notwithstanding the increased cost of raw material. Mill quotations are as follows on base sizes 2 $\frac{3}{4}$ to 5 in., in carload lots: Steel Tubes, 68.35; Iron, 55.35; Seamless, 50.35; 2 $\frac{1}{2}$ -in. and smaller and lengths over 18 ft., and 2 $\frac{1}{2}$ in. and lengths over 22 ft., 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1 $\frac{1}{2}$ in.....	40	35	42 $\frac{1}{2}$
1 $\frac{1}{2}$ to 2 $\frac{1}{4}$ in.....	50	35	35
2 $\frac{1}{4}$ in.....	52 $\frac{1}{2}$	35	30
2 $\frac{3}{4}$ to 5 in.....	60	47 $\frac{1}{2}$	42 $\frac{1}{2}$
6 in. and larger.....	50	35	..

Merchant Steel.—Owing to the Steel Bar advance practically all merchant lines were marked up \$2 a ton. Inasmuch as practically all the large consumers are covered on contracts until the middle of next year, only a small tonnage will be affected. We revise quotations as follows: Planished or Smooth Finished Tire Steel, 1.96 $\frac{1}{2}$ c.; Iron Finish, up to 1 $\frac{1}{2}$ x $\frac{1}{2}$ in., 1.91 $\frac{1}{2}$ c.; Iron Finish, 1 $\frac{1}{2}$ x $\frac{1}{2}$ in. and larger, 1.76 $\frac{1}{2}$ c., base; Channels for solid rubber Tires, $\frac{3}{4}$ to 1 in., 2.26 $\frac{1}{2}$ c., and 1 $\frac{1}{2}$ -in. and larger, 2.16 $\frac{1}{2}$ c.; Smooth Finished Machinery Steel, 2.01 $\frac{1}{2}$ c.; Flat Sleigh Shoe, 1.71 $\frac{1}{2}$ c.; Concave and Convex Sleigh Shoe, 2.06 $\frac{1}{2}$ c.; Cutter Shoe, 2.35c.; Toe Calk Steel, 2.21 $\frac{1}{2}$ c.; Railway Spring, 1.86 $\frac{1}{2}$ c.; Crucible Tool Steel, 6 $\frac{1}{2}$ c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, in base territory.

Cast Iron Pipe.—No contracts of note for 1907 shipment have been placed during the week, and owing to the rapidly advancing Iron market the Pipe makers are not anxious to quote at present for forward shipment. Quotations are unchanged, as follows: Water Pipe, 4-in., \$36; 6, 8, 10 and 12 in., \$34.50; over 12-in., \$34, with \$1 extra for Gas Pipe.

Coke.—Local consumers of Foundry Coke are experiencing increasing difficulty in securing shipments from both the Connellsville and Virginia fields and an active spot market has been developed. Quotations are firm at \$4 at the ovens, equivalent to \$6.65, Chicago, for Connellsville, and \$6.25 for Virginia. By-product grades are firm and scarce at \$6.65, Chicago.

Pittsburgh.

PARK BUILDING, November 21, 1906.—(By Telegraph.)

Pig Iron.—There is a great deal of inquiry in the market for Basic Iron for delivery in first half of next year, and in some cases for delivery through third and fourth quarters. For shipment in first and second quarters \$21.50 to \$22, Valley furnace, is quoted, and for delivery running into third quarter \$21 is asked. We do not hear of any sales of Bessemer in the past week for prompt delivery, but it is possible that above \$22 would be paid for prompt shipment. However, we continue to quote Bessemer and Basic for prompt delivery at \$22, Valley furnace, or \$22.85, Pittsburgh. There have been some fairly large sales of Foundry Iron for next year, the United States Cast Iron Pipe & Foundry Company having bought considerable tonnage for first half of the year delivery. We quote Northern No. 2 Foundry for prompt delivery at \$23.50 to \$24 and for first half of the year delivery at \$22.50 to \$23, Valley furnace. There have been no sales of Northern Forge in this market in the past week and we continue to quote at \$22, Valley furnace, or \$22.85, Pittsburgh.

Steel.—Both Bessemer and Open Hearth Billets for prompt delivery are very hard to obtain. We quote Bessemer Billets from \$29.50 to \$30, and Open Hearth \$31.50 to \$32, Pittsburgh. We quote Sheet and Tin Bars in random lengths at \$29.50 to \$30, Pittsburgh, while Cut Bars bring 50c. a ton advance.

(By Mail.)

Specifications on contracts on all kinds of Finished Iron and Steel are unusually heavy, and the mills are not able to catch up on delayed deliveries, but, on the contrary, seem to be getting further behind. Tonnage in Pig Iron sold during the week has been small, but the furnaces are so far behind in deliveries that it seems useless for them to take on more business and make the situation worse. Bessemer and Basic Iron for prompt delivery command about \$22, Valley furnace, but Basic Iron for shipment in first quarter

and first half of next year is offered on the basis of \$21 or less. Bessemer Billets are still very scarce, and command \$29.50 to \$30, and Open Hearth, \$31.50 to \$32, Pittsburgh. In some quarters the impression prevails that we have reached the crest of the market, while, on the other hand, some in the trade believe that prices will go still higher. It is figured out by conservative interests that the market on practically everything is amply high, and any attempts to put prices on a higher basis should be discouraged.

Ferromanganese.—A local consumer has bought 150 tons of foreign Ferro for delivery over first half of next year at a price reported to be somewhat under \$80, Pittsburgh. We quote 80 per cent. foreign Ferro for forward delivery at \$80 to \$82.50, while for prompt delivery about \$85, Pittsburgh, is quoted.

Wire Rods.—It is practically impossible to quote a market on Wire Rods, as they can hardly be had at any price. With Bessemer Billets selling at about \$30, Pittsburgh, Bessemer Rods ought to bring \$37, and Open Hearth Rods about \$38, Pittsburgh. It is possible that higher prices would be paid for Rods if sellers would agree to guarantee deliveries.

Muck Bar.—The continued advance in the price of Forge Iron has had the effect of causing a sharp advance in Muck Bar and we now quote best grades of Muck Bar, made from all Pig Iron, at \$36 to \$36.50, and from part Scrap, at \$33 to \$34, Pittsburgh.

Skelp.—Mills rolling Skelp are filled with tonnage and are far behind in deliveries, with the result that it is hard to find a mill that will take contracts for Skelp and agree to make deliveries within a reasonable time. Prices are higher and we now quote as follows: Grooved Steel Skelp, 1.65c. to 1.70c.; Sheared Steel Skelp, 1.70c. to 1.75c.; Grooved Iron Skelp, 1.75c. to 1.80c.; Sheared Iron Skelp, 1.85c. to 1.90c., Pittsburgh, these prices depending on widths and gauges.

Steel Rails.—During the week the Carnegie Steel Company entered orders for 25,000 to 30,000 tons of Standard Sections, among which was 18,000 tons for the Gainesville & Gulf Railroad, and also took a large tonnage in Light Rails. The recent advance of \$1 a ton in Light Rails is being firmly held, and we now quote these as follows: 20 to 45 lb., \$32; 16-lb., \$33, and 12-lb., \$34, at mill. Standard Sections remain at \$28 at mill.

Structural Material.—The American Bridge Company has taken a contract for a viaduct for the Westside Belt Railroad, about 850 tons, and a considerable tonnage of bridge work for the Toledo, St. Louis & Western Railroad, also contracts for upward of 14,000 tons for constituent companies of the Steel Corporation, including about 2900 tons for the buildings for the new cement plant at Duquesne. Much small work is coming in which aggregates considerable tonnage. An immense tonnage in buildings and bridge work is in sight, but may not develop much before next spring. Many buyers of Structural Steel have covered their requirements for first half of next year and are now specifying freely on these contracts. Prices are firm and we quote: Beams and Channels, up to 15-in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x $\frac{1}{4}$ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3 $\frac{1}{2}$ in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-in. are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—Two Eastern Plate mills have advanced their prices on Steel Plates \$2 a ton, or to the basis of 1.70c., Pittsburgh. Other mills continue to ask premiums of \$1 to \$2 a ton for reasonably prompt shipment. Most of the leading Plate mills now have specifications on their books covering their output for the next two months or longer. We quote: Tank Plates, $\frac{1}{4}$ in. thick, 6 $\frac{1}{4}$ in. up to 100 in. in width, 1.60c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than $\frac{1}{4}$ -in. to and including 3-16-in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates.....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of $\frac{1}{2}$ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—We note continued active demand for Sheets, the mills having the heaviest tonnage on their books ever known, and deliveries are delayed from three or four weeks to three months, depending on sizes and gauges. Specifications on contracts continue to be received in large volume, and shipments by the mills are heavy. The market is firm, and for reasonably prompt delivery some Sheet mills are asking and obtaining premiums of \$1 to \$2 a ton over regular prices, which are as follows: Blue Annealed Sheets, No. 10 gauge and heavier, 1.80c; Nos. 11 and 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 2c; Box Annealed, Nos. 17 to 21, 2.35c; Nos. 22 to 24, 2.40c; Nos. 25 and 26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.55c; Nos. 12 and 14, 2.65c; Nos. 15 and 16, 2.75c; Nos. 17 to 21, 2.90c; Nos. 22 and 24, 3.05c; Nos. 25 and 26, 3.25c; No. 27, 3.45c; No. 28, 3.65c; No. 29, 3.90c, and No. 30, 4.15c. We quote No. 28 Gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.15 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances for small lots from store.

Iron and Steel Bars.—Effective November 15, the Carnegie Steel Company advanced its price on Steel Bars \$2 a ton, or to 1.60c, base, Pittsburgh. The Jones & Laughlin Steel Company made the same advance about a week before, so that all the mills are now quoting Steel Bars on the basis of 1.60c. minimum, while some ask 1.70c. to 1.75c., Pittsburgh, these higher prices being for specified delivery. On Iron Bars Republic, Lockhart, Zug and Sligo are quoting 1.80c. to 1.85c., Pittsburgh, and are getting these prices. New business in both Iron and Steel Bars continues very heavy, and the mills are loaded for the next three or four months or longer. We quote Steel Bars at 1.60c. to 1.70c. base, half extras, f.o.b., Pittsburgh, depending on deliveries. Iron Bars are 1.80c. to 1.85c., Pittsburgh, and the market is very strong.

Hoops and Bands.—A heavy tonnage was placed prior to the recent advance in prices, and buyers are specifying freely on these contracts, the mills being filled for two or three months ahead or longer. We quote: Steel Hoops, 2c., and Bands for all purposes at 1.50c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of \$2 a ton being charged for less than carloads.

Tin Plate.—The demand continues exceedingly active, several of the very large canning interests being in the market with heavy inquiries for delivery over first six months. With the tonnage now on their books, together with the heavy volume of business that is being placed, the Tin Plate mills are reasonably sure of all the business they can handle up to March or April of next year. Output continues to be restricted by shortage in supply of Tin Bars. We quote \$3.90 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Railroad Spikes.—The demand continues enormously heavy, and the leading makers are filled up for the next three or four months, and are absolutely refusing to book business for delivery before March or April of next year. We quote Spikes on contracts for indefinite delivery at \$2.40 to \$2.50 per 100 lb., while for reasonably prompt delivery from \$2.75 up to \$3 is quoted.

Spelter.—There has been a sharp advance in Spelter since our last report, caused a heavy demand from galvanizing plants and other consumers. We now quote prime grades of Western Spelter at 6.30c., St. Louis, equal to 6.42½c., Pittsburgh.

Pipes and Tubes.—Last week the National Tube Company secured a contract from the Mellon interests for 430 miles of 8-in. Line Pipe to be used in building an oil line from Indian Territory to the Gulf. This Pipe weighs 28 lb. to the running foot, and the contract is one of the largest ever placed in the Pipe trade. Some other heavy business in Pipe lines is in sight, but is not far enough along to make mention of in this report. New tonnage in Merchant Pipe continues heavy and the mills are pretty well filled for the next two or three months, specifications on contracts considerably exceeding the output of the leading mills. Nothing official has been given out in regard to another advance in prices of Pipe, but with the enormous tonnage on the books of the mills and the high prices of Steel Plates it would seem that Pipe would stand another advance of two points, or \$4 a ton. The extreme discount on Merchant sizes of Steel Pipe is now 79 and 5 per cent. off to the large trade. The official discounts, which are shaded one point or more to the large trade, are as follows:

Merchant Pipe.

	Jobbers, carloads.			
	Black.	Galv.	Black.	Galv.
¾ and ¾ in.	70	54	63.5	49.5
¾ in.	72	58	65.5	57.5
¾ in.	74	62	73.5	63.5

¾ to 6 in.	78	68	73.5	63.5
7 to 12 in.	73	58	69	54
Extra strong, plain ends:				
¾ to ¾ in.	63	51	58.5	46.5
¾ to 4 in.	70	58	65.5	53.5
¾ to 8 in.	66	54	61.5	48.5
Double extra strong, plain ends:				
¾ to 8 in.	59	48	53.5	42.5

Boiler Tubes.—Heavy inquiries for Locomotive Tubes are in the market, some of the leading railroads desiring to cover their entire requirements for all of 1907. An Eastern mill has recently taken a large contract for Locomotive Tubes, deliveries running over the first half of next year. The demand for Merchant Tubes is only fair, but specifications on contracts are being received in good volume. We are advised that the official discounts are being firmly held and are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	45	50
1½ to 2¼ in.	45	62
2¼ in.	50	64
2½ to 5 in.	57	70
6 to 13 in.	45	62

Iron and Steel Scrap.—The market has again shown a sharp advance on nearly all kinds of material and dealers claim it is comparatively easy to sell Scrap to-day at prices quoted below, but the difficulty lies in getting the material. Several of the leading railroads have recently sold their Scrap at what they claim to be the highest prices they ever obtained. It seems to be largely a sellers' market, and dealers are very firm in their ideas as to prices. We have again advanced prices on practically all lines of Scrap. We quote per gross ton, f.o.b. Pittsburgh: Heavy Steel Melting Scrap, \$18.50 to \$19; No. 1 Wrought Scrap, \$21.25 to \$21.50; No. 2 Wrought Scrap, \$18.75 to \$19; Old Steel Rails, short pieces, 6 ft. and under, for Open Hearth purposes, \$18.50 to \$19; Old Steel Rails, rerollers, \$22 to \$22.50; Bundled Sheet Scrap, \$17.75 to \$18; Cast Iron Borings, \$12.75 to \$13; Wrought Turnings, \$23.50 to \$24; Old Car Wheels, \$24; Low Phosphorus Melting Stock, \$24 to \$24.50; Steel Axles, \$23.50 to \$24; Iron Axles, \$31 to \$32; No. 1 Cast Scrap, \$19.50 to \$20; Stove Plate, \$16; Grate Bars, \$15; Railroad Malleable, \$18.50 to \$19.

Coke.—We are advised that some contracts for Connellsville Furnace Coke for first half of next year have been made on the basis of \$3 to \$3.10 at oven, and there are reports that as high as \$3.25 has been paid. Strictly Connellsville 72-hr. Foundry Coke is selling readily at \$3.75 to \$4 a ton at oven, and contracts for first half of the year delivery have been made at the higher price. One or two prominent makers of Foundry Coke have declined to fix a price on their Coke for first half of the year delivery until December 1, and intimate that it will not be less than \$4 a ton at oven, and may be higher. The Upper and Lower Connellsville regions turned out last week 395,815 tons. The labor supply is fairly plentiful, car service is quite good and the shipments are enormous.

Birmingham.

BIRMINGHAM, ALA., November 18, 1906.

Pig Iron.—The demand for spot Iron in small quantities is still urgent and it is bringing from \$23 to \$25 per ton. First quarter delivery is still being quoted at \$21 by the one or two concerns who have not withdrawn for that period. The principal business being done now is for second quarter, and on this the minimum quotation is \$18.50 on a No. 2 Foundry basis, with prices made by different furnaces ranging all the way up to \$20 a ton. Some inquiries for third quarter have been received, but are only considered as feelers by the producers and are therefore not treated very seriously. No sales for this delivery have been reported. The car situation remains unchanged, which means that it is about as bad as it could possibly be; and, to make matters worse, the railroads are getting very short of motive power owing to the excessive amount of through business being handled. It is said that there are several thousand cars in the railroad yards here to-day waiting for engines to move them, and as all kinds of merchandise gets preference over Pig Iron a great hardship is being worked on the melters throughout the country. The weather is ideal for making Iron and another record breaking production may be expected this month.

Cast Iron Pipe.—Pending a more settled condition of the Iron market a number of buyers who will require Pipe for next year's delivery are hesitating about placing orders, and it is probable that much business in this line will be deferred until after the holidays. All foundries in the district have orders sufficient to run them well into next year and are making no concessions to get new business. The market is decidedly strong, with prices on Water Pipe approximately as follows, f.o.b. cars here: 4 to 6 in., \$33; 8 to 12 in., \$32; over 12 in., \$29, with \$1 per ton extra for Gas Pipe.

Old Material.—The call for Heavy Cast Scrap to take the place of Pig Iron is most urgent, and it is with much difficulty that dealers are able to supply the demand. No. 1

Steel is eagerly sought after, and Wrought of every kind is moving more freely than for months. Quotations are about as follows per gross ton, f.o.b. cars dealers' yards:

Old Iron Rails.....	\$21.50 to \$22.00
Old Iron Axles.....	19.00 to 19.50
Old Steel Axles.....	16.50 to 17.50
Old Car Wheels.....	18.50 to 19.50
No. 1 Railroad Wrought.....	19.00 to 19.50
No. 2 Railroad Wrought.....	15.50 to 16.00
No. 1 Country Wrought.....	15.50 to 16.00
No. 2 Country Wrought.....	12.50 to 13.00
Wrought Pipe and Flues.....	13.00 to 13.50
Railroad Malleable.....	13.00 to 13.50
No. 1 Steel.....	14.00 to 14.50
No. 1 Machinery Cast.....	15.00 to 15.50
Stove Plate and Light Cast.....	11.00 to 11.50
Cast Borings.....	8.00 to 8.50

T. G. Bush, president of the Alabama Consolidated Coal & Iron Company since its organization some 16 years ago, announces his retirement as soon as his successor can be elected and installed, and a meeting of the Board of Directors will be held the latter part of this month for this purpose. Under the present management the affairs of the company have been highly successful, and from a small beginning the holdings have been developed and extended until at the present time they are among the most valuable in the district. Colonel Bush will take a much needed rest, after which he will devote his entire time to his private affairs. The name of his successor has not been made public, but it is understood he will be a Baltimore man.

The cement industry is rapidly forging to the front in Alabama, and bids fair at no distant day to divided honors with the manufacture of Iron and Steel. In addition to the plant at Leeds, the first part of which is nearing completion and which will produce 1000 barrels daily when fully equipped, the Winona Portland Cement Company has just been incorporated at Selma, with a capital of \$1,000,000, and will at once begin the erection of a plant at Epes, Ala., with a daily capacity of from 1500 to 2000 barrels. The deposits of cement rock and shale in this State are pronounced by experts among the finest in the world.

Cleveland.

CLEVELAND, OHIO, November 20, 1906.

Iron Ore.—The extreme shortage of Ore for a straight Bessemer mixture, even for next year's delivery, is already causing some serious concern among consumers. Fear that the supply will not be adequate is not confined to the strictly high grade Ores, but extends as well into the other grades, and has brought about a condition where one of the leading shippers is already selling its remaining output at a premium of, it is reported, 50c. to 60c. a ton. It is stated that regular customers have been taken care of at the prices recently established, but that new and later buyers have been compelled to pay the advance. Confirmation is thus given to Duluth advices to *The Iron Age* a week ago that some of the shippers are holding quantities of Ore from the market to be sold at higher values later on. So far the charges of premiums have been confined to a few producers, but it is possible, since the market pays the premium so readily, that producers generally will take the stand before long that what Ore remains unsold will have to bring a higher price. The subject of Ore prices is one on which opinions differ considerably. Some adhere to the old analysis as a base for quotations, while others insist that values should be gauged on the new guaranteed content. According to the opinion of the first, Old Range Bessemer should properly be based on \$5, f.o.b. Lake Erie ports, while the latter take the difference in guarantee into consideration and insist the new price should be \$5.17 f.o.b. Lake Erie ports. The first basis means an advance of 75c. a ton in Bessemer, while the second makes the rise 92c. a ton. The difference is whether the Ore is purchased according to bulk or according to the amount of metallic Iron obtained by the purchaser. But whatever the basis adopted, the action of such producers as are now charging a premium adds 50c. to 60c. to the ton. The question of production has been the subject of a great deal of conjecture. Since most of the strictly Merchant Ore has been sold, with the few exceptions indicated above and in the Duluth dispatches, it is apparent that the total production for next year will depend very largely on the needs of the Steel making companies owning their own Ore deposits. The Pig Iron trade generally and the Steel trade are assured of prosperity for at least the first half of next year. Since the Ore sold now is largely for consumption the second half of next year and the first half of 1908, it has been argued there is room for some scaling down of the amounts to be shipped by the Steel making companies for their own use. The movement which took place last week, however, when some consumers of Bessemer and Basic Pig Iron bought for second half delivery, seems to extend the assurance of good business to the second half and to promise a steady demand for Ore. This being the case, it is now anticipated the output of Ore for the season of 1907 will be fully up to the capacity of the Lake Superior mines. This has brought about the confident prediction in Ore circles that the total production will be at least 40,000,000 tons and may run to 42,000,000 tons or more. This forecast is based

partly on the apparent need of consumers and partly on the fact that to get the same amount of metallic Iron it will be necessary next year to produce a greater bulk of the lower grade Ores. As for the production this year, it is now virtually assured that the total movement will be at least 38,000,000 tons. The November movement to date has been nearly up to the movement for September, and consequently makes an entirely new record for so late in the season. This is going far toward removing the possibility of a shortage of Ore during the winter. It is reported that some small carrying contracts have already been made with the shippers for the movement of Ore next season. The basis of rates is unchanged, being 75c. from Duluth to Ohio ports; 65c. from Marquette, and 60c. from Escanaba.

Pig Iron.—Producers of Pig Iron are confessing their forecasts of the market have proved hopelessly futile in the face of a demonstration the character of which has never before been seen in this territory. On previous occasions it has been admitted freely that when the price of either Foundry or Steel making Irons reached \$25 a ton in the Valleys the danger line was passed and that buyers might be expected to begin to withdraw from the market. In view of the current prices for all Irons it had been expected that a period of hesitation would precede the buying of Iron for second half delivery, especially until something is known of the extent of next year's crops. It was astonishing, therefore, to note during the week the beginning of contracting for Bessemer and Basic Iron for delivery the last half of next year. It is difficult to say now what the tonnage already covered has amounted to, but it is asserted some good sized lots have been sold. The price paid was \$21, Valley furnace. Bessemer and Basic are hardly to be had, except in very small lots, either for spot shipment or for delivery the first quarter of next year. When a furnace is able to squeeze out a car or so the price ranges from \$25 to \$26 at the furnace. Second quarter material is selling freely at \$23 to \$25 at the furnace. A few of the very largest Foundry Iron producers have still a small unsold portion of their output, which is going for spot shipment at \$25.50 to \$26 at furnace. No Iron is being sold for first quarter unless it is coupled with an order for second quarter delivery, on which the price ranges from \$23 to \$24 at the furnace.

Coke.—The Coke market is exceptionally strong and there is a brisk demand, the short car supply being a factor. The best grades of 72-hour Foundry are selling on the basis of \$4 to \$4.25 at oven on contracts running through the first half of next year, although spot Coke is just a little easier. Furnace Coke is selling on the basis of \$3.25 to \$3.50 at oven, both for spot shipment and on first half contracts, the inquiries being large.

Finished Iron and Steel.—The market has grown a little more intense. Mills in general are a little further behind with their orders, and there is just a trifle stronger tilt upward in prices, due to the increase in the number of consumers who are forced to patronize Eastern mills at premium prices to obtain prompt delivery. The crux of the situation appears to be the Billet market. Rerolling Billets are practically off the market for the time being and the demand is strong. There does not appear to be the same expectation of shortage 60 to 90 days hence, and sales are being made for those deliveries at comparatively reasonable prices. Forging Billets are selling at \$38 to \$40, delivered, while for later delivery they command \$35 to \$36, Pittsburgh. It is estimated that Rerolling Billets can be bought for 60 to 90 days' delivery at \$28 to \$29, Pittsburgh. Sheets are strong, with the mills running about three months behind their orders. Most of the business for prompt delivery is done, consequently, out of stock, on which prices continue to be based on 2.15c. for No. 10 Blue Annealed, 2.90c. for No. 28 One Pass Cold Rolled and 3.90c. for No. 28 Galvanized. While it is known that most of the lake shipyards have about sold out their capacity in new ships for 1907 delivery, it is understood there are more orders pending. Specifications against Plate and Shape contracts have been heavy, and some of the buyers have been forced to augment these specifications by small orders to Eastern mills where premiums are paid of \$2 to \$4 a ton. Bar Iron is now strong, selling on the basis of 1.70c. to 1.75c., Pittsburgh, with a good demand and the supply short. Bar Steel is strong on the basis of 1.60c., Pittsburgh.

Old Material.—The demand for No. 1 Cast is extremely strong, due to the inability of Foundry interests to get No. 2 Pig Iron. Prices have been boosted until practically an equivalent of present Foundry Iron prices has been paid. It is hard to get the material. The remainder of the market has held about steady. The quotation given below of No. 1 Cast is that which is being paid generally, with the understanding that much higher prices have been paid in particular instances. The following are dealers' prices to the trade, f.o.b. Cleveland, per gross ton: Old Steel Rails, \$18 to \$19; Old Iron Rails, \$25.50 to \$26.50; Iron Car Axles, \$23; Heavy Melting Steel, \$18 to \$19. Per net ton: Cast Borings, \$10 to \$10.50; No. 1 Busheling, \$15.50 to \$16; No. 1 Railroad Wrought, \$18 to \$18.50; No. 1 Cast, \$20; Iron and Steel Turnings and Drillings, \$12 to \$12.50.

Philadelphia.

PHILADELPHIA, Pa., November 20, 1906.

The situation in the Iron and Steel trade is becoming more difficult week by week. Prices continue their upward movement, while production and imports begin to show an important increase; this on high priced Iron is enough to cause at least some hesitation in following the movement much further. The supply of domestic Pig Iron is now over 500,000 tons per week, while the imports will average probably 10,000 to 15,000 tons more, giving us a supply of not less than 26,500,000 tons per annum. Moreover, it is very likely that the increase in production will continue for some time longer, in which case there should not only be a full supply, but there may be more than that, and with Iron at \$25 a ton it is certainly a very different state of affairs to that when we are having \$16 and \$17 Iron. It cannot be denied, however, that for the present everything that can be supplied is promptly taken, not only for early deliveries, but for periods extending over at least the first half of next year. With facts such as these confronting us it may seem somewhat pessimistic to look a long way ahead in search of trouble, and yet every man of experience in the trade will admit that \$25 Iron is a high figure, and especially with prospects of an increasing production month by month for some time to come. The foreign situation is not as strong as might be expected, considering the heavy drafts that we have made, and in Germany it is said that the situation is quite reactionary, although it may be premature to suppose that it is likely to be at all serious. Nevertheless, it is pretty clear that the eyes of Europe are directed toward the United States, and in case of any weakness developing on this side it would surely give both England and Germany a bad jolt.

Pig Iron.—Sales have been made the past few days at higher prices than at any time during the present movement. Of course the tonnage that is moving cannot be very heavy, in view of the enormous quantities purchased the past two or three months, but there appears to be no abatement of the demand for anything that can be delivered in reasonably prompt time. Foreign Iron which is arriving is mostly sold before it gets into the harbor, and as the tonnage already received or within sight is quite important it must have helped us over a very serious difficulty. There is not the slightest trouble in selling anything, for any delivery, and almost at any price that sellers may choose to name. Of course they wish to be as moderate as possible, but when consumers insist on having Iron for three, six and nine months' delivery, sellers are naturally forced into a position where they can demand high figures; higher figures, in fact, week by week. Naturally there will be an end to this sometime, but so far there is nothing whatever to indicate that it is near at hand. It is extremely difficult to give quotations, as they vary according to circumstances, and one consumer who buys at \$24.50 may be paying no more than one who buys at \$23.50 or less when the circumstances are taken into consideration. Prices are about as follows for the first and second quarter of 1907 for deliveries in eastern Pennsylvania territory, subject to 50 cents to \$1 premium for anything that can be had in 1906:

No. 1 X Foundry.....	\$25.00 to \$25.50
No. 2 X Foundry.....	23.75 to 24.25
No. 2 Plain.....	23.00 to 23.50
Standard Gray Forge.....	21.00 to 21.50
Ordinary Gray Forge.....	20.25 to 21.00
Basic.....	21.50 to 22.00
Low Phosphorus.....	26.75 to 27.00
Malleable.....	22.00 to 23.00
Middlesbrough No. 1, on dock.....	22.25 to 22.50
Middlesbrough No. 3, on dock.....	21.50 to 21.75
Scotch, on dock.....	23.75 to 24.00

Old Material.—Bids and offers for material delivered in buyers' yards are about as follows:

Steel Crops.....	\$19.50 to \$20.00
No. 1 Steel Scrap.....	19.00 to 19.50
Low Phosphorus.....	23.00 to 24.00
Old Steel Axles.....	23.50 to 24.50
Old Iron Axles.....	31.50 to 32.00
Old Iron Rails.....	26.50 to 27.50
Old Car Wheels.....	22.50 to 23.00
Choice No. 1 R. R. Wrought.....	23.00 to 23.50
No. 1 Yard Scrap.....	20.50 to 21.00
Long and Short.....	19.00 to 19.50
Machinery Scrap.....	19.75 to 20.25
Wrought Iron Pipe.....	16.75 to 17.25
No. 1 Forge Fire.....	16.50 to 17.00
No. 2 Light.....	11.50 to 12.00
Wrought Turnings.....	15.25 to 15.75
Axle Turnings.....	16.75 to 17.25
Stove Plate.....	16.25 to 16.75
Cast Borings.....	12.50 to 13.00
Grate Bars.....	14.50 to 15.00

The market is very strong, and dealers will not sell excepting at outside figures quoted above.

An estimate has been made that about \$500,000,000 will be needed by the railroads of the United States for extensions and improvements the coming year. Assuming that it will be possible to secure the money thus required, the country will be very greatly benefited by the distribution of so vast a sum.

Cincinnati.

FIFTH AND MAIN STS., November 20, 1906.—(By Telegraph.)

Pig Iron.—The past week, while exhibiting marked strenuousness, has eased off somewhat, at least so far as spot demand is concerned. The car situation, however, has grown materially worse, and the imperfect shipping facilities that confront the trade play a very important part in establishing quotations. This is perhaps more in evidence as the days go by, as it is a well defined proposition that several of the larger Southern producers have considerable tonnage available, but are unable to make shipments on account of inability to secure the required equipment. Appearances indicate that the shipments of Iron from abroad have to a certain extent allayed the anxiety of the foundrymen of the East, and this has had a beneficial effect on the market generally. The situation does not appear to be so strained as it was. As yet there appear to be very light inquiries into the third quarter of 1907, with here and there one covering with some small business for this delivery. Prices for Southern Iron are practically as reported last week, excepting that deliveries for second quarter have been advanced nominally 50c. per ton. Reports indicate that virtually the entire output of the Northern furnaces has been taken through the second quarter, and little relief can be looked for from this source. One or two large melters are reported in the market for several thousand tons, each for delivery during next year. The following furnaces are reported out of blast temporarily, thereby curtailing production in the neighborhood of 600 tons daily: Rising Fawn, Star, La Follette, Rockdale, Citico, and one Rockwood. Freight rates from the Hanging Rock District to Cincinnati are \$1.15, and from Birmingham \$3. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$26.00 to \$27.00
Southern Coke, No. 2.....	25.00 to 26.00
Southern Coke, No. 3.....	24.00 to 25.00
Southern Coke, No. 4.....	23.00 to 24.00
Southern Coke, No. 1 Soft.....	26.00 to 27.00
Southern Coke, No. 2 Soft.....	25.00 to 26.00
Southern Coke, Gray Forged.....	22.00 to 23.00
Southern Coke, Mottled.....	21.00 to 22.00
Ohio Silvery, 8 per cent.....	29.15 to 29.65
Lake Superior Coke, No. 1.....	25.65 to 26.65
Lake Superior Coke, No. 2.....	25.15 to 26.15
Lake Superior Coke, No. 3.....	24.65 to 25.65

Standard Southern Car Wheel.....	\$28.00 to \$28.50
Lake Superior Car Wheel.....	27.00 to 27.50

Coke.—Shipments from Connellsville District are reported coming forward in a fairly satisfactory manner, while floods and storms have interfered materially with the production in several of the Virginia fields. The demand continues strong and we quote best brands of Connellsville and Virginia Foundry from \$4 to \$4.25, f.o.b. ovens.

Finished Iron and Steel.—This market is strong, with specifications coming in heavy along all lines. The Structural mills are as busy as ever, with contracts running far into next year. Quick shipments of Steel Bars are said to be hard to obtain at any price. The Plate market is firm, but shipments can be secured quite promptly. Prices of Steel Bars show an advance of \$2 per ton. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.88c., with half extras; the same, in smaller lots, 2.10c., with full extras; Steel Bars, in carload lots, 1.73c., with half extras; the same, in smaller lots, 1.95c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, ¼-in. and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16 gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14 gauge, in carload lots, 2.05c.; in small lots, 2.60c.; Steel Tire, 1 x ¼ in. or heavier, 1.93c., in carload lots.

Old Material.—The demand is strong, and there is a ready sale for all available Scrap. Prices are strong and appear to be hardening. We quote dealers' prices, f.o.b. Cincinnati, as follows:

No. 1 Railroad Wrought, net ton.....	\$18.50 to \$19.50
Cast Borings, net ton.....	9.50 to 10.50
Steel Turnings, net ton.....	11.50 to 12.50
No. 1 Cast Scrap, net ton.....	16.50 to 17.50
Old Iron Axles, net ton.....	26.50 to 27.50
Old Iron Rails, gross ton.....	25.00
Old Steel Rails, long, gross ton.....	17.50 to 18.50
Relaying Rails, 56 lb. and up, gross ton.....	28.50 to 29.50
Old Car Wheels, gross ton.....	18.50 to 19.50
Low Phosphorus Scrap, gross ton.....	19.50 to 20.50

The Firth Stirling Steel Company, which is building a plant at Gelsborough Point, near Washington, D. C., has bid \$25 each for 1000 6-in. projectiles, against \$43.25 bid by the Bethlehem Steel Company and \$41.60 by the Midvale Steel Company. Bids were opened November 14. The contract is for 1000 each of 6, 7, 8 and 12 in. steel armor piercing projectiles. The Washington concern asks \$190 for the 12-in. shell, as compared with \$328 each by the Bethlehem Company and \$346.70 each by the Midvale Company.

Metal Market.

NEW YORK, November 21, 1906.

Pig Tin.—Higher prices have been recorded, due to a growing apprehension among consumers that there may be a shortage of metal during the latter part of this month. The operations of the leading interest have not occupied so prominent a place as during the preceding weeks, but the amount of Tin which was reshipped to Europe on the Minneapolis proves to have been far short of the first estimates. The situation as to local stocks is therefore not as unfavorable as apprehended, unless more metal should be reshipped later in the month. It is reported that this interest has purchased largely in the East, but this lacks confirmation from London. The week's business has been largely confined to purchases by manufacturers of electrical supplies, it being a rather peculiar occurrence that the week before business was made up of purchases by the packing interests. The low price of the week was on the 16th, when Tin was sold at 42.70c., and on the 20th metal was sold at prices varying from 43.10c. to 43.15c. To-day's prices are slightly lower at 42.70c., following lower prices from London, which market closes at £195 5s. for spot and £196 15s. for futures. The total imports so far this month are 2944 tons and the net imports 2741 tons, which takes in account the 203 tons exported. There are afloat for American ports 2230 tons. There is not the apprehension about shortage during the latter part of the month that was so prevalent during the week previous; still, all of the Tin is held in very strong hands. The Minnehaha, which will bring in a goodly amount of metal, has a greater part of its Tin consigned to large interests.

Copper.—There appears to be renewed interest in the export Copper market, and several sales have been made for export to Europe. These sales were for Electrolytic brands for shipment during December, and went at somewhat over 22½c. We also learn of a sale of Electrolytic to domestic consumers at about 22½c. for shipment this year. There is little interest in Lake Copper at present, and the price is somewhat above 22½c. For deliveries during January and February prices are largely a matter of individual bargaining, but range from 22c. upward. It is interesting to note that but little Sulphate of Copper has been made, and when the demand from European agriculturists comes undoubtedly refined metal will have to be used, which adds an element of strength to future positions. The London market has established a new high record, and on Monday £103 5s. was quoted for three months' delivery, which is the highest price ever recorded. Spot is quoted lower to-day at £100 12s. 6d., futures at £102. Best Selected is also higher, touching the price reached in October of £107. The exports are large, amounting to 12,148 tons for the first 20 days of the month.

Pig Lead.—The position in Lead is unprecedentedly strong for this season of the year, and prompt shipments are very hard to obtain. Early in the week sales were made on a basis of 6c., New York, but now the price is higher, and it is impossible to get Lead below 6.05c. to 6.10c. In St. Louis the market is active at 5.87½c. The American Smelting & Refining Company has so many orders on its books that there is little likelihood that it can take any more orders for this year's delivery. Selling terms continue unchanged, and the price governing old contracts is 5.75c. The strength in the Lead situation has largely been brought about by increasing demands from electrical manufacturers, especially makers of telephone cables and other underground electrical conductors which are sheathed in Lead.

Spelter.—The market, which had been active and strong for a fortnight, tumbled on Tuesday, and the metal sold on a basis of 6.35c., New York, or 6.25c., St. Louis. It has been well known that outsiders were taking business at less than the prevailing figures, but it was not believed until recently that they secured such a large share of the going business.

Antimony.—There is more than the usual amount of manipulation of the market, and various prices are quoted, generally somewhat above the market. Cookson's can be obtained at 26c., Hallett's at 25c., and outside brands at 24½c. to 25c.

Ferroalloys.—There is an urgent demand for Ferro-silicon, and it appears that practically all metal for December shipment from domestic producers is already sold. Shipments from Europe in December, which would mean January and February delivery, are quoted at \$106 upward. There is a fair demand for Ferromanagane, but not as large as a month ago, and the price is unchanged at \$82.50, f.o.b. Pittsburgh. Ferrochrome is held at \$150 to \$162 for 60 per cent. Chromium, with carbon contents varying from under 6 to 10 per cent. For 65 to 70 per cent. Chromium, with carbon contents varying from under 6 to 10 per cent., the price is \$175 to \$187.50.

Nickel.—There is a good demand at the unchanged price of 45c. for ton lots and 55c. to 65c. for smaller quantities.

Aluminum.—The supply is not nearly equal to the demand, but the price is unchanged at 36c. for No. 1 Ingots and 34c. for No. 2.

Tin Plates.—There have been some heavy orders placed in Europe for American delivery of Oil Tins, for which the price is about 14s. 7½d. for 124 sheets of 14 x 18½, f.o.b. Swansea. American Tin Plates are in heavy demand at the unchanged price of \$4.09 for 100-lb. IC Coke Plates, f.o.b. New York, and \$3.90, f.o.b. Pittsburgh. In Swansea Welsh Plates are 3d. higher at 14s. 3½d., due to the advance in Iron.

Old Metals.—The demand continues to exceed the supply and dealers are asking the following high prices:

	Cents.
Copper, Heavy Cut and Crucible.....	21.00 to 21.50
Copper, Heavy and Wire.....	20.50 to 21.00
Copper, Light and Bottoms.....	18.75 to 19.00
Brass, Heavy.....	15.00 to 15.50
Brass, Light.....	12.00 to 12.50
Heavy Machine Composition.....	19.00 to 19.50
Clean Brass Turnings.....	13.75 to 14.25
Composition Turnings.....	16.75 to 17.25
Lead, Heavy.....	5.75
Tea Lead.....	5.50
Zinc Scrap.....	4.90

New York.

NEW YORK, November 21, 1906.

Pig Iron.—There has been some good buying both of domestic and foreign Irons, the former for forward deliveries and the latter for prompt. The markets are firmer, with inquiries extending further into the future, and with foreign Iron being well taken. Scotch Iron has advanced, No. 1 being now quoted \$24 to \$24.50, ex-ship, duty paid, while No. 3 is quoted at \$23.25 to \$23.50. No. 1 Middlesbrough is quoted \$22.50 to \$23, and No. 3 \$22 to \$22.50. We quote for Northern Iron, at tidewater, for spot, \$25 to \$26, and for No. 2 Foundry \$24.50 to \$25. For delivery during the first half we quote No. 2 Foundry \$23.50 to \$24, and for the second quarter \$23.25 to \$23.50. Southern Iron is selling at \$23 to \$24 for No. 2 for the first quarter, and \$22.50 to \$23 for the second quarter.

Steel Rails.—The fact that a number of railroads have already increased their original orders for 1907 indicates a repetition of the way in which business has piled up on the books of the mills. If there has been much of such underestimating the tonnage of next year will be prodigious. In the past week the Atlantic Coast Line's order for 25,000 tons has been booked, and the Delaware & Hudson has placed 16,000 tons with the Pennsylvania Steel Company. Other orders include 5000 additional for the Texas & Pacific, 5000 tons for the Monongahela Connecting Railroad, 2000 tons for the Georgia Railroad, 2000 tons additional for the Deepwater Railroad, 4000 tons for the Virginia Air Line and scattering orders amounting to 7000 or 8000 tons.

Structural Material.—The mills are not beset with orders to the extent noticed in the summer and early fall. Long used to having six and eight months' business ahead, they are not entirely complacent when deliveries can be made in 30 or 60 days, heavy as the tonnage still is and better satisfied as all consumers are that roll changes are more frequent. For the American Bridge Company November has been thus far the lightest month of the year. The principal bridge business is 5000 tons, virtually closed, for the Lackawanna Railroad. At Ely, Nev., the American Smelting & Refining Company will build a new plant for which it has ordered 1500 tons of Steel from the Minneapolis Steel & Machinery Company. The Missouri Pacific has placed 3000 tons of bridge work with the Pennsylvania Steel Company, which has also taken 350 tons for the Illinois Central. We continue to quote on tidewater deliveries, mill shipments, as follows: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. and on Angles over 6 in. the extra is 0.10c. Sales out of stock of material cut to length continue to be made at 2¼c. to 2½c. The amount of speculative building of apartment houses and commercial structures in New York City is showing some shrinkage, due to money market conditions. As this construction draws on the store trade in Shapes, the latter has been correspondingly less active of late.

Bars.—Prices are strong on both Bar Iron and Steel Bars. While Best Refined Bar Iron can still be had on the basis of 1.70c., Pittsburgh, or 1.84½c., tidewater, more makers are asking \$1 per ton higher. The market is fairly active, some good transactions being reported. Steel Bars are now uniformly quoted at a minimum of 1.60c., Pittsburgh, or 1.74½c., tidewater, as minimum, but the mills are so well supplied with work that it is difficult to secure early delivery. Heavy Steel Bar orders have been placed for reinforced concrete work, about 14,500 tons being reported in four orders. The general demand for Steel Bars has been very good, orders for 1000 tons being quite frequent.

Plates.—Another Eastern manufacturer of Steel Plates has this week advanced all grades \$2 per ton, and others are scrutinizing specifications carefully before taking orders. Nevertheless, much business is being rushed in to those still quoting old prices. It looks very much as if the advance

would be general at a reasonably early day. The cause of the advance by the manufacturers who have just marked up their prices is stated to be partly the increased cost of raw materials and partly the rapidity with which order books are being filled. Quotations on general business are as follows, at tidewater, on carload shipments: Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 2.14½c. to 2.24½c.; Firebox Plates, 2.24½c. to 2.60c., according to specifications.

Cast Iron Pipe.—The market continues to grow stronger. The minimum price on carload lots of 6-in. Pipe at tidewater per net ton is now \$34 for contracts with a delivery beginning next spring, while for early delivery as high as \$36.50 would have to be paid. Current business is excellent and the foundries are steadily filling up further into the future. The prospects for next year continue exceedingly favorable.

Old Material.—While business has been decidedly good in almost all lines, the greatest activity is still observable in Foundry stock, such as Heavy Cast Scrap, Stove Plate, Grate Bars, Car Wheels, &c. Prices on all these grades of Old Material are higher than a week ago. While numerous rolling mills are pursuing a cautious policy in making purchase of such stock as they use, avoiding if possible the stimulation of prices, others are being compelled to buy and the demand is much greater. The eastern Pennsylvania Steel manufacturers are likewise sedulously endeavoring to keep down the prices of Steel Scrap, but from other quarters comes a growing demand. Rolling mill stock and Steel Scrap are out of line with Foundry material, and dealers are looking forward to a change in this respect, as the discrepancy is quite marked. Approximate prices for New York and vicinity per gross ton are as follows:

Old Iron Rails.....	\$24.50 to \$25.00
Relaying Rails.....	28.00 to 28.50
Old Steel Rails, rerolling lengths.....	18.50 to 19.00
Old Steel Rails, short pieces.....	16.20 to 16.75
Heavy Melting Steel Scrap.....	16.25 to 16.75
Standard Hammered Iron Car Axles.....	29.00 to 30.00
Old Steel Car Axles.....	22.00 to 22.50
No. 1 Railroad Wrought.....	21.00 to 21.50
Iron Track Scrap.....	18.00 to 18.50
No. 1 Yard Wrought, long.....	18.50 to 19.00
No. 1 Yard Wrought, short.....	18.00 to 18.50
Wrought Pipe.....	14.50 to 15.00
Light Iron.....	10.00 to 11.00
Cast Borings.....	10.00 to 11.00
Wrought Turnings.....	13.00 to 14.00
Old Car Wheels.....	20.50 to 21.50
No. 1 Machinery Cast.....	18.00 to 19.00
Stove Plate.....	14.50 to 15.00
Grate Bars.....	13.50 to 14.00
Malleable Cast.....	18.00 to 19.00

Iron and Industrial Stocks.

NEW YORK, November 21, 1906.

Although the supply of money has been somewhat restricted, and rates on both call loans and commercial paper have been working upward, the general tendency of prices in the stock market has been stronger. The impression appears to prevail that money will become more plentiful in the course of a few weeks, and that in the meantime the strong interests in the stock market will be able to hold prices firmly. The influences at work in favor of high prices have therefore been encouraged to proceed. In almost every case the active industrial stocks were considerably higher on Tuesday of this week than on Thursday of last week. Following is the range of prices during this period on the stocks which were most active: Car & Foundry common 43¾ to 45¾; Locomotive common 73 to 76½; Colorado Fuel 51¾ to 54½; Pressed Steel common 53 to 55; Railway Spring common 52 to 52¾; Republic common 35 to 37½, preferred 98 to 99¾; Sloss-Sheffield common 72¾ to 73½; United States Steel common 46¾ to 49¾, preferred 104¾ to 105¾; Can preferred 53¾ to 55½. Last transactions up to 1.30 p.m. to-day are reported at the following prices: Car & Foundry common 44¾, preferred 101¾; Locomotive common 75½; Steel Foundries common 10, preferred 44½; Colorado Fuel 54¾; Pressed Steel common 54¾, preferred 98¾; Railway Spring common 53; Republic common 36½, preferred 99¾; Sloss-Sheffield common 73¾; Tennessee Coal 159¾; United States Cast Iron Pipe common 47½; United States Steel common 48½, preferred 105½; Can common 6¾, preferred 55.

Transactions have begun on the "curb" in New York in the stock, when issued, of the ore company to be organized by the Great Northern Railroad Company to manage the ore properties recently leased by that company to the United States Steel Corporation. The price has ranged from 90 to 91½.

The stockholders of the General Electric Company at their meeting in Schenectady yesterday ratified the plan to increase the company's authorized capital stock from \$60,000,000 to \$80,000,000. About \$11,000,000 of additional stock, or 20 per cent. of the amount now outstanding, will be issued in the near future to provide additional working capital and increased manufacturing facilities. The balance of the stock will remain in the treasury for future requirements. The company now has unissued, apart from the in-

crease authorized yesterday, about \$5,000,000 of stock, so that only about \$6,000,000 of the newly authorized stock will be included in the \$11,000,000 which is to be offered to the stockholders at par.

New Publication.

The Copper Handbook. Volume VI, 1906. Published by Horace J. Stevens, Houghton, Mich. \$5.

The well-known Copper Handbook, by Horace J. Stevens, has now reached its sixth volume. The late appearance this year was occasioned by the illness of the author, but the inconvenience caused by its delay is more than compensated by the late returns from many copper mining properties. While the title may seem somewhat of a misnomer, as the present volume contains over 1100 pages of reading matter listing some 5000 copper mining companies in all parts of the world, yet it has been the aim of the author to condense all of the information as much as practicable. The task of compiling information from the various mines must of necessity be a large one, and the value of the volume to the manufacturer as well as the investor can be well seen by the care with which defunct companies are listed, as well as the new concerns which are simply prospects. The sharp criticism of wild cat mining schemes which the author has given in previous volumes is continued in this one, and will doubtless be of more value than formerly, owing to the great increase in such properties. In addition to the information regarding copper properties, there is a valuable compilation of copper statistics as well as useful information regarding the history, geology, mineralogy and metallurgy of copper.

Foreign Commerce Extension.—A national convention for the extension of the foreign commerce of the United States is to be held in the New Willard Hotel, Washington, D. C., January 14, 1907. The movement is under the auspices of the New York Board of Trade and Transportation. The committee having in charge the arrangements for the convention is composed of E. S. A. de Lima, chairman, Cornelius N. Bliss, Franklin Murphy, Herman A. Metz, Charles A. Moore, William McCarroll, Lewis Nixon, Henry W. Peabody, Charles A. Schieren and Isidor Straus. The secretary of the committee is Frank S. Gardner, 203 Broadway, New York City. A circular has been issued which invites all national, State and local associations interested in the objects of the convention to send at least five delegates each. The Governor in each State is invited to appoint 10 delegates to the convention and furnish them with a credential. Strict rules have been laid down for the government of the convention, so that the votes cast on the consideration of each question will be properly apportioned among the delegates. The Secretary of State has consented to address the convention and will give it the benefit of his observations and experiences and of the information acquired on his recent tour of the South American countries, the object of which was to bring about closer relations between those countries and ourselves. The committee believes that the present time is ripe for this move for the betterment of our relations on business lines with our South American neighbors.

Last week the regular annual meeting of the sales agents of the LaBelle Iron Works, Steubenville, Ohio, was held in the Duquesne Club, Pittsburgh. Business policies and other matters were discussed with officials of the company, the conferences being presided over by Isaac M. Scott, president. The sessions were concluded with a banquet, at which addresses were made by some of the officials and agents, and which was a very enjoyable occasion.

The new No. 3 furnace of the Republic Iron & Steel Company at Haselton, Ohio, is nearing completion and will be blown in in December. In the Shenango Valley the company's Hall furnace, which is being relined, while its blowing capacity is being increased, will be ready to resume in January. Atlantic furnace, at which similar improvements are being made, will blow in in February.

A Tidal Power Plant.

Interesting tests are being made at South Thomaston, Maine, in the hydraulic compressing of air by tidal power. A working model has been in experimental use for some months, preliminary to the establishment of a large plant that is planned to develop 2000 hp. The power will be distributed for industrial purposes in neighboring cities and towns through pipe lines. This general system of compressing air by falling water is already in commercial use in several places in this country and Canada, in streams where a waterfall produces the same results that the South Thomaston experiments would indicate can be accomplished by the tidal currents. It is the Taylor system which has been established to develop power at Norwich, Conn.; Magog, Quebec; near Ainsworth, B. C., and at Peterborough, Quebec. The tidal plant will remove one great objection which exists in streams: there will be no necessity of shutting down because of low water, for the tidal current passes in and out twice every day.

The plant at South Thomaston, a suburb of Rockland, Maine, is the first to compress air by the fall of salt water. Under this system the rise and fall of the tide are not used for power purposes in the accepted meaning of the term, but for syphoning. To outline the proposed plant, which will follow the experimental model, a shaft will be sunk approximately 190 ft. deep and 40 ft. in diameter, belled out to larger diameter at the bottom. Within this will be the inflow shaft and the outflow shaft. The inflow shaft opens into a belled chamber, corresponding in form to that of the main shaft, though not filling it. At the base of the inflow shaft is a conical stone altar, upon which the water impinges, and is so divided as to liberate the entrained air, which rises to a storage chamber cut in the rock. The water, freed of air, continues on, rising through the outflow shaft and emptying into the tailrace. Special means are provided for entraining the air in the water as it enters the inflow shaft. The air exists in the water in the form of bubbles. As they descend their contained air is compressed by the weight of water above them. When the air is separated from the water in the South Thomaston plant it will have a pressure of 95 lb. to the inch.

This being a tidal plant, it must have a double equipment to a certain extent, in order that the difference in level of the water may be taken advantage of on both the ebb and flow of the tide. These plants will work on a fall, or difference in level, of 1 ft. On the coast of Maine the difference in the tidal level is 12 ft. There is, of course, 1 hr. in every 12 that the plant is inoperative, but as the air storage will run the plant 24 hr. without the generation of additional air the loss from the period of idleness is overcome.

This power cannot be developed everywhere that the tide rises and falls. There must be a formation, either natural or artificial, that will allow the tide to flow through an inlet passage narrow enough to be dammed at not too great a cost, and thence on into an upper basin or reservoir. The amount of power that can be developed depends entirely upon the area of the upper basin. It should never be too large for the tide to fill, but the larger it is the more water will flow into it and out of it, and hence the more power. It is stated that salt water carries much more air than fresh water, as may be noted by observing the difference between the wake of a steamboat in salt and fresh water.

The coast of Maine has many of these natural reservoirs, probably more than any other State of the Union, and it is estimated by engineers that if these different natural powers were harnessed as units of a system the resultant effect would be over 1,000,000 hp., enough to furnish more power, after transmission, than could be utilized in all the remainder of New England.

The results obtained from the large plant will be watched with much interest. It has already been demonstrated that compressed air can be transmitted long distances in pipe lines, and, of course, compressed air is an established and important factor commercially. If the initial large unit operated by tidal power proves a suc-

cess, as its promoters believe to be assured, a source of power will be opened which should have an important place in power development. The Rockland Power Company, Rockland, Maine, is financed for the work, and is beyond the promoting stage. It controls a number of patents issued to William O. Webber, Boston, the company's consulting engineer, pertaining to the compressing of air by tidal power.

Trade Publications.

Street Lighting System.—Nernst Lamp Company, Pittsburgh, Pa. Pamphlet. Pertains to the Nernst series alternating vertical glower street lighting system. Illustrations of parts of the lamps, lamps on plain and ornamental poles, and the complete lighting system are given.

Basket and Stapling Machines.—Saranac Machine Company, St. Joseph, Mich. Pamphlets. Describe and illustrate the Advance No. 2 wire stapling machine; the Advance automatic basket machine, the one-quart size of which has a capacity of from 30,000 to 40,000 baskets and the one-pint size from 40,000 to 50,000 baskets in 10 hours; the Climax basket stapling machine, which makes about 1500 baskets in 10 hr.; the Advance crate separator and head stapling machine for assembling and stapling separators and panel heads; Advance box shock stapling machine, which is claimed to overcome the difficulties encountered in using the sheet metal box shock fastener; the Advance universal crate stapling machine, for stapling together the sides and covers of crates; the Advance stave bushel basket stapling machine, which is capable of putting together 150 dozen 20-stave 1-bushel baskets per day, and the Advance automatic butter dish machine, capable of producing from 90 to 100 dishes per minute.

Graphite Brushes.—Joseph Dixon Crucible Company, Jersey City, N. J. Pamphlet. Deals with Dixon's graphite brushes for motors and generators, which the company first manufactured experimentally in an endeavor to find something superior to carbon brushes for use in its own electric plant. After largely improving on the brushes they were placed on the market.

Corundum Wheels.—Star Corundum Wheel Company, Limited, Detroit, Mich. Leaflet. Deals with pure corundum wheels adapted for all purposes, but especially for work requiring a very cool and rapid cutting wheel.

Electric Lights.—Moore Electrical Company, 52 Lawrence street, Newark, N. J. Catalogue. Gives illustrations of the Moore electric light installed in various kinds of buildings, and explains the construction and operation. Photographs are being made in studios by this light and equal those made by natural light, it is claimed. The light can also be used for photographic printing, being highly actinic.

Drills.—Francis Reed Company, 43 Hammond street, Worcester, Mass. Illustrated catalogue and price-list. Deals with upright drills for hand and power, sensitive drills with 1 to 10 spindles, clamp drills and planer chucks, upright nut tappers with two, three and four spindles, and drill chucks. One inclosed circular shows an automatic feed for sensitive drills and another concerns a new multiple drilling attachment, which was described in *The Iron Age* February 1, 1906.

Grinders and Shears.—Canton Foundry & Machine Company, Canton, Ohio. Two circulars. One deals with Nos. 1, 2, 3, 4 and 5 emery grinders, with prices and tables of dimensions. The other pertains to Universal alligator shears, designed for high speed, and for cutting up sheet iron, light bar iron, copper scrap and soft metal. Tables of dimensions are included.

Tubes.—Western Tube Company, Kewanee, Ill. Catalogue. Entitled "Special Tubing for Special Uses." Explains various ways in which round, square and rectangular tubes can be used to advantage in machine construction and structural work. The standard sizes of these tubes are given in a tabular form.

Railroad Water Service.—American Valve & Meter Company, Cincinnati, Ohio. Catalogue C. Size, 6 x 9 in.; pages 60. Pertains to the style D, Poage water column with the Fenner drop spout. Illustrations of installations of these water columns on various railroads are given, and also sectional views of the different styles. The parts of the water columns are described separately.

Machinery.—Baird Machine Company, Oakville, Conn. Circulars. One deals with the No. 1 bench press, for light blanking, piercing, clipping, forming, closing, swaging, riveting and light embossing. Illustrations show this press mounted on a bench and also on an iron table. Another pertains to vises provided with steel jaws, for use on milling machines, planers, or upright drills, and a third to the Baird tilting tumbler, which will run horizontally or vertically, or at any intermediate elevation. The barrels can be furnished of wood, steel or brass.

Air Engines.—The Weir & Craig Mfg. Company, Chicago, Ill. Circular. Deals with the J. L. Pilling, 1906 model, compressed air engines, manufactured solely by this company.

The Machinery Trade.

NEW YORK, November 21, 1906.

Additional large inquiries for machine tools were received in the trade the past week, and at least a start was made to cover one of the large lists on which houses submitted figures some weeks ago. The buying seems to emanate from every direction, and new projects have come to the front that will necessitate the purchase of large quantities of mechanical equipment. It is rumored that two of the machinery companies in this city are to make important additions to their lines and capacities, the announcement of which will likely be made within the next week or two.

Following the announcement by the General Electric Company of an advance in its prices of from 5 to 10 per cent., other electrical equipment manufacturers have given similar instructions to their salesmen, and all of the large interests are now asking advanced prices. This is especially pleasing to the smaller manufacturers of electrical power apparatus, who have been awaiting such action on the part of the larger interests with eagerness, but it is declared by all concerned that the raise will only about meet the increased cost of material and will not add materially to the manufacturers' profits. They cite the fact that most manufacturers have been working night shifts, which are not especially profitable.

The advance in the price of electrical supplies and machinery has had its effect on the crane industry, according to prices now quoted to prospective purchasers in this city. The fact that electric motors have gone up 10 per cent. has caused a material advance in the price of electric traveling cranes. This advance has gone into effect with all prominent crane manufacturers, many of whom depend on the large electric companies for their motors, and prices are now about 15 per cent. higher than they were a year ago. Not long ago most of the prominent manufacturers raised their prices about 10 per cent.

To Purchase Ridgway Machine Tool Company.

Because of the great demand for large machine tools the Niles-Bement-Pond Company has made arrangements to purchase the plant of the Ridgway Machine Tool Company of Ridgway, Pa., and arrangements toward that end are now being perfected, and will be completed within a short time. The contract for the sale has been drawn and only awaits signing, as all the details are otherwise agreed upon. Accountants are now at Ridgway, and when their labors are completed the deal will be put through. This arrangement will in no way affect the Ridgway Dynamo & Engine Company, controlled by the same interests as the machine tool company. The two companies have always been operated separately, and the Dynamo & Engine Company will continue as before. It is understood that the Niles-Bement-Pond Company will complete all the contracts now in the hands of the Ridgway Company. The latter company has a large and especially well equipped plant which in many ways is especially adapted for the manufacture of heavy machine tools, in which line the Ridgway people have stood as specialists. The terms of the projected transfer will not be made public as yet, but it is admitted by those in authority to state that there is nothing now apparent that will prevent the agreement becoming effective as soon as the accountants are through with their work.

The Niles-Bement-Pond Company, at a meeting held yesterday afternoon at its offices, 111 Broadway, increased its common stock from \$5,000,000 to \$8,500,000, which with the \$2,000,000 of preferred stock makes the company's total capital \$10,500,000. This money will be used to increase the company's manufacturing facilities in various directions. The arrangements for the Ridgway purchase were not gone into at yesterday's meeting, but were settled at a previous conference.

Machinery Requirements for Manual Training School.

The Superintendent of School Buildings of the Department of Education, New York, will receive bids until November 26 for the mechanical equipment for the Stuyvesant Manual Training High School on Fifteenth and Sixteenth streets, near First avenue. While most of the machines are specified and alternates are given, machines equal in design and construction to those specified will be accepted in place of those described. The following machine tools are required:

- Item 1. One 24-in. surfacer, one 12-in. hand jointer, one No. 6 column fret scroll saw.
- Item 2. Two 36-in. band saws.
- Item 3. One 24-in. power band saw.
- Item 4. One universal saw bench with 14-in. saws.
- Item 5. One improved mortiser and borer.
- Item 6. One 24-in. improved pattern makers' lathe with 8-ft. bed; three 16-in. improved pattern makers' lathes, with 6-ft. beds.

Item 7. Three 12-in. special large wood turning lathes with 5-ft. beds; 68 10-in. special manual training school lathes with 3-ft. 6-in. beds; one 11-in. improved design hand lathe with 3-ft. 6-in. bed; one 18-in. motor driven engine lathe with 6-ft. bed; four 14-in. motor driven engine lathes with 5-ft. beds; one 12-in. motor driven engine lathe with 6-ft. bed; one 12-in. motor driven lathe with 6-ft. bed; one 12-in. motor driven tool room lathe with 5-ft. bed; twelve 12-in. engine lathes with 5-ft. beds; one 11-in. hand lathe with 4-ft. bed; one 9-in. hand lathe with 3½-ft. bed; 30 11-in. improved designed hand lathes with 3-ft. 6-in. beds; two 11-in. improved design hand lathes with 4-ft. beds; one 11-in. improved design hand lathe with 3-ft. 6-in. bed.

Item 8. One 8-in. bench lathe with 3-ft. bed, to be driven by a ¼-hp. motor.

Item 9. One 24-in. vertical drilling machine complete with back gears.

Item 10. One 20-in. standard upright drill.

Item 11. One No. 1 sensitive drill 15-in. swing.

Item 12. One 13-in. sensitive drill.

Item 13. One 13-in. bench drill press.

Item 14. One No. 2 two-spindle sensitive drill press.

Item 15. One 22 x 22-in. planer with 4 ft. bed.

Item 16. One 16-in. shaper.

Item 17. One 7-in. bench shaper.

Item 18. One No. 1½ universal milling machine; one No. 1½ plain milling machine.

Item 19. One No. 2 bench hand milling machine.

Item 20. One 8 x 24-in. universal grinding machine.

Item 21. One cutter and reamer grinder.

Item 22. Thirteen 16-in. water tool grinders; three 20-in. water tool grinders.

Item 23. Two drill grinders.

Item 24. Two 1½-in. floor grinding machines; one 1-in. bench tool grinder; one 12 x 2-in. grinding machine; one 10 x 1½-in. grinding machine.

Item 25. One 12-in. and one 10-in. ring oiling polishing machine.

Item 26. One improved two-spindle centering machine.

Item 27. Two No. 3 metal sawing machines.

Item 28. One No. 2 back saw.

Item 29. One power hack saw.

Item 30. One No. 0 power press.

Item 31. One No. ½ plain drop press.

Item 32. One power shear, capacity 4 x ½ in. flat iron and 1½ in. round iron; one combined punch and shear to punch ¾-in. hole in 9-16-in. iron, to shear 4 x ½ in. flat iron or 1½ in. round iron.

Item 33. One No. 4 power hammer with 100-lb. ram.

Item 34. One horizontal power blower, capacity 3 cu. ft. of air per revolution; one horizontal power blower, capacity ½ cu. ft. of air per revolution.

Item 35. One duplex single acting belt driven air compressor.

Item 36. One 26 x 36 in. tumbling barrel; one 2000-lb. jib crane; one 30-in. universal molding machine; ladles and flasks; one sand blast cleaning machine; one core machine; one wire and rod cutter; one chipping hammer; one 1000-lb. overhead I-beam trolley hoist.

Item 37. One No. 2 combined punch and shear; one 22-in. improved squaring shear; one No. 3½ and one No. 2 arbor press; one No. 1 bolt heading machine.

Item 38. Thirty-nine motors, from ½ to 10 hp.

Item 39. Seventeen forges and two blowers.

Item 40. One 1000-lb. hoist.

Item 41. One 5 x 7 in. vertical center crank engine; air and circulating pump; surface condenser; one 5-hp. gas engine; one 4 x 6 in. single acting triplex pump; one 6-in. hot air pumping engine; one 12-in. double tangential water wheel; one 1-in. horizontal two-stage centrifugal pump; one 4½ x 4½ in. air compressor; one 30,000-lb. standard screw power testing machine; one transverse testing machine; 5 motor generator sets.

Pennsylvania Railroad's Machine Tool List.

The Pennsylvania Railroad Company's inquiry for prices upon 600 steel passenger cars, which has been made through the company's purchasing department, is the most important of all the recent inquiries. The adoption of this style of car will mean much to the steel and iron industries. The establishment of a small repair shop upon the line of the new electric road has resulted in the following small list of tools for that point: One 18 x 36 in. x 8 ft. extension gap engine lathe, complete with countershaft, center rest, large and small face plates, gears, &c.; one 14 in. x 7 ft. cone head lathe, with oil pan tap attachment, countershaft, &c.; one 20-in. back geared shaper, complete with countershaft, &c.; one 24 x 36 in. upright drilling and tapping machine, complete with countershaft, &c.; one small friction sensitive drill press, with Morse taper; one grinding machine on column, complete with countershaft, to carry two 10-in. emery wheels; one power driven pipe threading and cutting machine, to cut and thread pipe from 1 to 6 in., with extra sets of chasers; one power hack saw, to cut material up to 4-in. round; one 10-in. speed lathe, with bed and countershaft. In addition to the foregoing, the following inquiries have been made: Engine lathe with 16-in. swing and 6-ft. bed, equipped with large and small face plates, screw cutting and feed mechanism, taper attachment, quick change gear and 14-in. independent chuck, bids to include counterwrenches and all usual attachments; one 32-in. vertical drill press, to be equipped with back gears, power feed and spindles for Pennsylvania Railroad standard taper shanks, machine to be complete with countershaft, wrenches, &c.; one 300 and one 400 ton hydraulic wheel press for pressing on and off car wheels up to and including 42 in. in diameter, full specifications and descriptions of these machines to accompany these bids, the machines to be belt driven by tight and loose pulleys, quotation to include countershaft and all necessary attachments; one horizontal milling machine, for finishing complete, front end frames for locomotives which are now finished on a large planer with an extension head, but it is necessary to set up the work several times, and it is desired with a milling machine to finish each side with but one set-up; one 6000-lb. steam drop hammer, for average run of drop forge work; one automatic machine for making

boiler punches and dies, as per the blue prints which accompany the inquiry.

To Build Large Railroad Shops.

It is learned on good authority that President Warren H. Truesdale of the Delaware, Lackawanna & Western Railroad has authorized the erection of a large machine shop and other buildings at Scranton, Pa., to comprise an extensive car plant to take the place of shops now located at that point. As was stated in *The Iron Age* several months ago, R. F. Kilpatrick, superintendent of motive power, prepared plans providing for extensive alterations and additions to the system of shops at Scranton, but at that time the project was held up awaiting the approval of the president of the company. We are given to understand now that Mr. Kilpatrick's plans have been passed upon in a general way, and although some alterations were made, they were not materially different than the original scheme of construction as outlined by Mr. Kilpatrick. It is said that the work will not be begun until the spring, but it is highly probable that owing to the present scarcity of machinery the company will shortly come into the market for the necessary equipment, which will mean a buying movement of some magnitude. Mr. Kilpatrick's plans provide for the razing of the existing locomotive and repair plant and the construction of a machine shop which will in all probability be one of the largest of its kind in the country. The building, which will be used for new construction work as well as repair work, will be 364 x 758 ft., approximately, and will have room enough for taking care of about 40 locomotives at one time. This will mean the doubling of the present shop capacity at Scranton. About the only thing in the yards which will not be demolished to make way for new buildings is the roundhouse, which is of practically modern construction. A feature of the machine shop will be the equipment of two bays to be used as erecting shops, which will be fitted with 15-ton cranes and other erecting machinery. Plans also provide for the installation of a 120-ton traveling crane of modern construction, as well as some smaller hoisting and conveying apparatus for the interior of the big shop. There will be a blacksmith shop, 126 x 300 ft., and a paint shop, pattern shop and pattern storage house, 50 x 300 ft. The plans also include a power house, the size not determined upon as yet, and other structures, including offices for the superintendent of motive power, the master mechanic and other officers. It has been planned to drive all the machines by electricity and the power plant, it is understood, will be built on the site of the present foundry. There are to be new ash beds and coal chutes, and there is much to be bought in the way of coal and ash handling machinery. The plans, it is understood, are now in the hands of Mr. Kilpatrick and Chief Draftsman James A. Mellon for some slight alterations, and it is probable that when they are completed the purchasing will be begun. The machinery equipment now in use at Scranton will be utilized in the new plant, but that will by no means be sufficient to cover the extensive requirements.

The Erie Railroad is making purchases against the large list it issued a few weeks ago for machinery to be installed in the new shops to be erected at Susquehanna, Pa.

Machinery is being purchased by the American Car & Foundry Company for its Jackson & Sharp plant at Wilmington, Del. Heretofore wooden cars have been the sole output of the plant, and the company is now changing the equipment so as to produce steel cars. It is for the manufacture of this new product that the machinery is being purchased, and as the buying has been more in the power line it is expected that the machine tool equipment will come up a little later. We understand from a reliable source that the company has only commenced buying the machinery for re-equipping the plant for its new product.

It is probable that at least some of the equipment for the Japanese Imperial Steel Works, for which inquiries were received in the trade some time ago, will be bought in this country, as at least some of the bidders have received word that those who are getting figures on the material are not greatly encouraged by the outlook in Germany, where it was said the business might be placed. From all accounts German manufacturers are getting sufficient business to admit of their demanding high prices, and in some lines at least Americans are in a position to compete with them, both from a question of delivery and prices. Some manufacturers who were indifferent over making bids when the lists were first sent out are now sending in proposals. Incidentally the Japanese have been placing considerable business of late, especially for ore conveying machinery, and the demand from that country for general machinery is especially good.

Canal and Power Work.

Additional contracts have been let for work on the Erie Barge Canal, and it is likely that the successful contractors will have to purchase a great deal of additional machinery to do the work. Contract No. 19 has been awarded to the Great Lakes Construction Company, Buffalo, N. Y., for \$1,496,000; contract No. 25 to the Atlantic, Gulf & Pacific Company, New York, for \$1,754,236, and contract No. 27

to the Kinser Construction Company, Chicago, Ill., for \$972,210. The greater portion of this work will be on the Champlain Canal.

The Great Lakes Construction Company, Buffalo, N. Y., informs us that it will use a variety of supplies and machinery in filling its contract for the canal work, and that it has most of the main plant. Among other things that it will require are cable ways, grab buckets, skips, electric motors, electric hoisting and pile driving apparatus, pumping plant, a limited amount of woodworking machinery, metal reinforcement for concrete, structural steel, bolts, nails, general hardware, &c.

While officials of the New York, Westchester & Boston Railroad will neither affirm nor deny the published report that the company has been amalgamated with the New York, Port Chester & Boston Railroad Company, they state emphatically that there will be no change in the construction plans of the road as outlined more than a year ago. The work of grading and line construction is progressing rapidly, and this includes the building of a large number of steel bridges, aggregating in all some 5000 tons of material, all of which have been contracted for. There has been considerable delay in awarding the contracts for the equipment for the company's main power house on which bids were received some time ago. It is stated authoritatively, however, that the contract will be awarded in blanket form and will go to one of the large electric companies. It is now stated that it will be several months before the question of equipping the proposed repair shop will be gone into, and the trade can expect to hear of inquiries for machine tools for that purpose some time next spring.

The Rowbottom Machine Company, Waterbury, Conn., contemplates the installation of a small power plant of the gas producer type, and the company would like to hear from manufacturers. Catalogues and communications on the subject should be addressed to George Rowbottom, president of the company.

The G. Siegel Company, 79 Duane street, New York, is having plans prepared by Architect W. L. Stoddard, 31 Union square, New York, for a two and four story building, 200 x 200 ft., to be erected at Bachman Station, Staten Island, for a color making plant. The plans include high pressure steam and electric power plants. The plans have not been perfected as yet and the amount of horsepower to be used is not known.

Bids will be received at the office of the President of the Borough of Richmond, New Brighton, Staten Island, for furnishing a furnace and steam boiler for the proposed West New Brighton refuse destructor. The specifications include an incinerator capable of burning 60 tons of mixed refuse in 24 hours, and those bidding on the destructor portion of the installation must furnish, in addition to the furnace and steam boiler, forced draft apparatus, &c.

Business Changes.

Owing to increasing business in the city and vicinity of Baltimore the H. W. Johns-Manville Company has opened a branch office at 315 Equitable Building, Baltimore, Md. This office will be in charge of W. F. Baird, previously connected with the Philadelphia branch of the company.

The Solid Steel Tool & Forge Company, Brackenridge, Pa., has arranged with the Spencer Otis Company, Railway Exchange, Chicago, to take its exclusive agency for the sale of car and locomotive forgings in the territory south of St. Paul, north of St. Louis and the district west beyond Pittsburgh and Cleveland to the Pacific Coast. This will not affect the company in its direct selling of track tools, nut locks and lines other than car forgings.

New England Machinery Market.

WORCESTER, MASS., November 20, 1906.

The payment of substantial bonuses for early delivery of machine tools has become a factor in the machinery market, as was inevitable. The usual bonus is about 5 per cent., but instances are reported of much higher premiums. In one extreme case a second-hand tool listed at about \$600 was purchased for \$400. The new owner submitted a bid to a manufacturer who was in the market for a machine of the type, quoting \$1000, and immediate delivery. The offer was accepted because the buyer could have the machine for use without delay. Such instances must be rare, of course, yet they tell the story of the market.

All machine tool builders are pretty much in the same box now in their inability to keep their promises of delivery. Houses, whose word has always been kept with scrupulous exactness, now state themselves that they have been compelled to join the list of procrastinators. One prominent manufacturer remarked to-day, "I have become a liar after years of trying to tell the exact truth." It is, of course, a case of necessity, with dealers and customers keeping telephone and telegraph lines busy clamoring for machinery. Orders have overwhelmed manufacturing departments, and in some instances have caused mix-ups in selling depart-

ments. Yet the manufacturers are striving their hardest to live up to every agreement. The past fortnight has brought such a deluge of orders that it is small wonder that a certain amount of confusion exists.

While a great part of the new business consists of small lots of machinery, not a few big orders are being placed. One dealer took an order which included 21 milling machines, and more than 20 lathes, besides a miscellaneous equipment during the week. Another order was for more than 20 big grinding machines. Manufacturers are receiving large orders from individual customers, and inquiries indicate that others will be placed the next fortnight.

The foundries are in bad shape, because their capacity is not equal to the demand upon them. Good steel castings are hard to get, excepting after a long wait. These conditions have handicapped the machine tool builders, but not to a serious degree thus far. It is the immediate future which is anxiously regarded by some of the machine tool men.

The dealers are doing their utmost to make hay while the sun shines, striving to get all possible business for delivery next year. They are all far ahead of other record years in aggregate business to date, totals having already been reached, which had not been expected until after more years of development of the field. The few weeks remaining of 1906 promise to make the aggregate even more gratifying. While paying their usual careful attention to the market for early delivery, wherever it is possible, the dealers are preparing for next season by getting every possible order for delivery then. Customers who are not sure that they will want the machines are urged to order them, and the dealers are rather banking upon some cancellations, that they may have the tools for quick delivery to other customers later on. The feeling exists in the trade that the dealer must take this means of preparation for next year or he will fall off in his totals, not because general business will be less, but because he will not be able to get tools for delivery excepting in the far future, and it is feared that next season buyers will not care to venture to purchase on such long delivery as they are now accepting.

The General Electric Company, according to its usual practice, specifies electric drive throughout in connection with the \$250,000 machine tool list for the new Lynn shops, printed in detail in last week's letter. The dealers and many manufacturers are busily engaged in preparing their bids, striving to make deliveries as moderate as possible. The General Electric has just bought a considerable list of tools for the works at Pittsfield, known as the Stanley-G. I. Electric Mfg. Company, but the total was small as compared to the new list. The dealers look to see the company purchasing largely next season for the Lynn works, which are so driven with business that expansion on a considerable scale seems inevitable.

The Fellows Gear Shaper Company, Springfield, Vt., is building a large addition to its works, which will greatly increase the capacity.

The reports of a consolidation of the independent shoe machinery interests are again renewed, but so far as can be learned little real progress has been made in bringing about the combination, which would be a competitor of the United Shoe Machinery Company. The Boylston Mfg. Company, Boston, which manufactures shoe machinery, is reported to be about to move to Fairhaven, Mass., to occupy a part of the plant of the Atlas Tack Company. The removal of the company's business does not extend to its machine shop, its management states, though its shoe factory may be located at Fairhaven. The independent companies at Lynn and elsewhere are buying some new machinery, but there is nothing in the machinery market to indicate buying on a large scale.

The Berbecker & Rowland Mfg. Company, Waterville, Conn., manufacturer of metal specialties, is to build an extension of its plant one story, 40 x 80 ft., with an ell 30 ft. long. It will be constructed with the intention of adding two stories when the need shall require it.

It is stated that the Atlantic Insulated Wire & Cable Company, Stamford, Conn., the plant of which was destroyed by fire November 15, will rebuild its works on a site recently purchased at Stamford. The company has a large business and the works will undoubtedly be of considerable size, requiring a large unit of power.

The Shawmut Mfg. Company is to erect a large pulp and paper mill at Shawmut, Maine, which means the creation of a power plant of large capacity.

Hill, Clarke & Co., Boston, have opened a large repair shop on Purchase street, near their store, the purpose being to do complete repair work on second-hand machinery.

The Norton Grinding Company, Worcester, Mass., is making a considerable extension of its work at Barbers Crossing, to afford much needed additional floor space and in preparation of much larger addition in the future. A brick building is under construction at the north end of the main shop and at right angles to it. It is 40 x 72 ft., three stories. It will serve as a connecting wing between the present shop and the new building which the future will doubtless require, and which will be a duplicate of the present shop, 80 x 160 ft., with monitor roof and broad

galleries surrounding the crane bay on three sides. On the first floor of the wing space is provided for an industrial railroad, connecting the crane floor of the present building and that which is projected. Through the wing is a passageway for teams, affording entrance to the yard which will be formed by the buildings. The offices and storerooms will be removed from the second floor of the main building to the wing, releasing floor space for manufacturing, affording room in the extended gallery for a number of light tools which now occupy a portion of the main floor under the gallery. The offices will be on the third floor of the wing, and the first floor will be given over to general stores and the second floor to finished parts and other substores. Several new tools have just been installed, including a Beaman & Smith combined vertical and horizontal milling machine, Prentice radial, Fellows gear shaper, Kemp Smith universal milling machine, Lucas No. 1 boring and milling machine, Becker-Brainard No. 50 milling machine and Hendey plain milling machine. The Norton Grinding Company is rushed with orders, both domestic and foreign, the recent bookings having been something very exceptional.

The Board of Trade, Salem, Mass., is planning the erection of an eight-story building, which will be rented for manufacturing. The plans comprise an electric plant which will provide power for electric drive throughout the building.

Philadelphia Machinery Market.

PHILADELPHIA, PA., November 20, 1906.

Business is slightly better. The demand appears to be more regular and there is a steady buying of new equipment. The majority of the sales made, however, are still of single tools, mostly of the class which can be furnished by merchants or manufacturers for fairly prompt delivery. This is particularly the case where purchases are made from merchants who have a fair variety of tools on their floors and who, when prospective buyers will not wait for future shipments, will ship from their floors rather than lose the opportunity to sell. In some cases when there is little prospect of replacing such tools except on long delivery this concession will not be made. Frequently, however, other tools (in limited numbers of course) are loaned for temporary use until the new tools can be furnished. Every effort is being made by the trade to satisfy the customer, although deliveries from tool builders are if anything becoming steadily more distant.

Inquiries in all lines keep up remarkably well and sales would be promptly made in many cases could anything like fairly prompt deliveries be made. As a rule these inquiries are for single tools or small lots, extensive equipment being practically unknown in this market at present. The railroad demand is slightly more active. The Pennsylvania Railroad has a few scattering inquiries out for tools, and there has been some little business from the Southern roads. An order for a small lot of tools was placed recently by the Chesapeake & Ohio Railroad, while the Atlantic Coast Line bought a round lot for distribution, it is understood, among its several shops.

Manufacturers of all classes of tools find no let up in the demand, and the day to day orders are sufficient to keep them fully booked up. Owing to the inability to obtain promptly raw materials and special parts entering into the construction of many of the different tools, some builders have met with unexpected delays and find difficulty in meeting delivery dates on which they thought ample time had been allowed.

There has been little change in the foreign demand. Inquiries have if anything fallen off, and fewer bookings of orders for special tools are heard of. A fairly good business continues to be transacted in the usual line of shop and power transmission specialties.

The second-hand machinery market continues very active, and sales could be readily made if dealers were able to supply the wants of the trade. Standard tools of recent make and in good condition are scarce and in some sizes almost impossible to get hold of.

Boilers and engines appear to be in better demand. Inquiries are more numerous, but business closes slowly, particularly in the local territory. Second-hand boilers and engines of the medium and lower powers are somewhat more active, but there is, in the opinion of the trade, room for considerable improvement.

There is no change in the foundry situation. The business being offered is probably the greatest in point of tonnage ever before the trade. Many plants could produce a larger tonnage, but the inability to obtain sufficient molders holds down the output. Delays in delivery are frequent, and cause more or less complaint on the part of machine tool builders, as well as the general consumers of both iron and steel castings.

The Philadelphia & Reading Railroad Company will, according to a permit recently taken from the Bureau of Build-

ing Inspection, enlarge its facilities for handling coal at its Port Richmond yards in this city. Among other items included is a new coal pier 1000 ft. long at Kensington and Lehigh avenues.

It is understood that the McLaughlin Iron, Steel & Rail Company, whose main office is in Pittsburgh, Pa., has purchased the plant of the Crum Creek Iron & Steel Company at Crum Lynne, Pa., which has been idle for some time. It is proposed to remodel the present plant and erect extensive additions thereto for the manufacture of steel rails and shapes.

The Vandyke-Churchill Company has secured the agency for the Eastern territory from the Hoefler Mfg. Company, Freeport, Ill., for its line of drill presses, of which a number of sizes will be kept in stock at its branch office in the Bourse Machinery Hall. Its local office reports business in good condition. Orders have recently been taken from the Atlantic Coast Line for a fair lot of machinery, including American lathes and planers, Higley cold saws, grinders, car wheel presses, &c., while a number of orders for individual tools have been booked from both local and nearby customers.

Dienelt & Eisenhardt, Incorporated, are very busy in all departments. Orders for hydraulic jacks are being received from both railroads and contracting concerns. The demand for dead stroke hammers has improved, and orders for several for the McCaffrey File Company and for a number of out of town customers have been booked. Numerous sales of Monarch electric motors and generators have also been made, while the foundry has a large amount of general work on its order books. This firm recently shipped a class B Lovekin pipe expanding machine and flanging machine, taking in sizes from 6½ to 16 in., to the Walworth Mfg. Company, Boston, Mass.

The E. H. Mumford Company, manufacturer of foundry molding machines, reports business in a very satisfactory condition. Inquiries are heavier than ever and cover molding machines of all classes, particularly for those of the special and more elaborate types for deep draft work. Sales of Rathbone multiple molding machines are increasing, and a number of machines of this type have been furnished both Eastern and Western concerns. Several heavy jolt and pattern drawing machines have also been delivered to local parties, while a number of large split pattern machines have been supplied to customers in different parts of the country.

W. E. S. Dyer, formerly manager of the Reeves Engine Company, Philadelphia, Pa., has been appointed manager of the Philadelphia office of the A. D. Granger Company, Commonwealth Building. With his new connection Mr. Dyer will handle not only the vertical automatic engines built by the Bates Machine Company, Joliet, Ill., but the Skinner automatic engines and a full line of fire and water tube boilers which the A. D. Granger Company manufactures. Warren A. Peters will remain at the Philadelphia office with Mr. Dyer.

Chicago Machinery Market.

CHICAGO, ILL., November 20, 1906.

During the week definite announcement was made by the Pullman Company of its intention to erect a steel car plant in this district, and although no definite sum has been set aside for its construction, its ultimate cost will range from \$5,000,000 to \$10,000,000. The Standard Steel Car Company, Pittsburgh, is already proceeding with its new plant at Hammond, Ind., contracts for the buildings having recently been awarded to the McClintic-Marshall Construction Company, Pittsburgh. The machinery requirements for equipping these plants will be very large, although it is doubtful if the lists of equipment can be promulgated before the first of the year; and in the case of the Pullman Company bids may not be asked for until spring. The westward march of the steel car industry has been largely influenced by the new plant of the Indiana Steel Company at Gary, Ind., making the steel in the form of plates and shapes easily available, and the haul to both works will only entail a minor switching charge. The plant of the Standard Steel Car Company will have a capacity of 100 cars daily, and the works of the Pullman Company may be equally as large. Awards will be made in a few days by the Arnold Company of this city for the tools and equipment for the Kansas City Southern Railroad. The original list, which was sent out nearly a year ago, has been greatly curtailed and many substitutions of machines previously specified have been made. Much of the equipment for the Missouri, Kansas & Texas Railroad, which is being placed through the purchasing department at St. Louis, has not yet been contracted for, as many of the tools are not required for nearly a year.

The work to be done immediately on the Oaklawn shops of the Chicago & Eastern Illinois Railroad at Danville, Ill.,

involves doubling the size of the boiler shop, the machine and blacksmith shops, and the storehouse. The roundhouse will be completed to the full circle by adding 17 stalls, and the transfer table will be extended to correspond to the increased length of the boiler and machine shops. A pattern storage house will be built west of the storehouse. No car work is done at these shops at present, the old shops on the west side of town being used for that purpose; but the concentration of all this work at the Oaklawn plant is contemplated and provision has been made accordingly in the layout. The future coach and paint shops are on the south side of the transfer table, and the future freight car repair yard, with its necessary buildings, west of the locomotive plant. The increase in area of the machine shop will more than double it, the new portion being 141 ft. wide, 20 ft. more than the present building, which will be widened this distance for the western half of its length. This will allow of a better arrangement of the tools than is possible in the present shop. The enlarged shop will have 28 pits. The extreme width of the new part of the roundhouse will be 90 ft., and the total number of stalls in the completed house will be 56. The design of each addition will be uniform with that of the building to which it is made. The total cost of the new work for buildings, equipment, &c., is estimated at over \$500,000.

To provide additional facilities for the erection of tools and other equipment the Charles F. Elmes Engineering Works, Chicago, will extend its erecting floor 40 x 150 ft. The building will be of fireproof construction and will be served by an electric traveling crane. The company manufactures hydraulic presses and valves, change cocks, pumps and special machinery.

The United Iron Works Company, Iola, Kan., has let contract to A. H. Ritter for the erection of a new boiler shop, which will be of brick construction, 90 x 150 ft. Mr. Ritter is to start the work immediately and the contract calls for the completion of the building within 90 days. The company will spend about \$10,000 in new equipment. When the building is completed employment will be given to a total of 125 men, about one-half of whom will work in the boiler department.

The Waterman Marine Motor Company, Detroit, Mich., has had plans prepared for a new factory, which will be 75 x 225 ft., one story high. Plans provide for the completion of the building, which will be of brick and concrete construction, January 1, 1907. The company is incorporated with a capital stock of \$75,000 and has the following officers: Cameron B. Waterman, president; Frank R. Thrall, secretary and manager. The line of manufacture will include marine motors and special machinery.

The Atlas Drop Forge Company, Detroit, Mich., has been organized, with a capital of \$100,000, for the purpose of erecting and operating a plant to manufacture drop forgings of all kinds. Plans are now being prepared for the buildings, and the list of machinery requirements, consisting of drop hammers, lathes, drill presses and miscellaneous machines, will shortly be promulgated. Officers and directors of the company are as follows: President, R. E. Olds; vice-president, Smith G. Young; secretary and treasurer, S. H. Carpenter; general superintendent, H. W. Bundy. The Board of Directors, in addition to the above, includes C. M. Norton, J. H. Moores and E. F. Peer.

The city of Milwaukee, Wis., is to erect a municipal electric lighting plant and has purchased a site and appropriated money with which to begin construction work. Robert W. Hunt & Co., Chicago, have been retained by the city to superintend the building of the plant. Plans and specifications are being drawn up by the Board of Public Works and the Municipal Lighting Plant Advisory Committee of the Common Council. H. S. Bowen, electrical engineer in the employ of Robert W. Hunt & Co., will be the resident engineer to superintend the construction of the plant.

The Department of Public Works of Chicago will receive bids until December 5 for one duplex steam compound air compressor and one improved engine lathe.

The Dayton Pneumatic Tool Company, Dayton, Ohio, is distributing to the trade, as an advertisement of the Dayton pneumatic hammers, a flat lead pencil with rubber eraser, encased in celluloid tube with gold tipped ends, the whole being of convenient size for carrying in the vest pocket.

The Electric Controller & Supply Company, Cleveland, Ohio, is favoring its friends with a photograph in relief of a beautiful woman, which makes a most acceptable souvenir.

Government Purchases.

WASHINGTON, D. C., November 20, 1906.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until December 4 for a large quantity of supplies for the Mare Island and Puget Sound navy yards, including pumps, motors, drills, generators set and emery grinder.

The Isthmian Canal Commission will soon ask bids for several No. 1 boring machines.

The Isthmian Canal Commission will receive bids until

December 6, Circular No. 341, for rock drills, well drills, engines, pipe cutting machine and other supplies.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until December 4 for saw filing machine, air drills, oil pumps, &c., for the Eastern navy yards.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until December 18 for the following machine tools for the Eastern navy yards: Schedule 265, planer, hoisting engines; schedule 266, engine lathe, metal saw, double end lathe; schedule 267, lathes; schedule 268, turret track turning and boring machine, planer; schedule 269, milling machine and tool grinders.

The following bids were opened November 1 for supplies for the Isthmian Canal Commission, Circular No. 335:

Bidder 6, Edwin Burnham, New York; 12, The Deane Steam Pump Company, New York; 14, P. Delany & Co., Newburgh, N. Y.; 17, The Fox Bros. Company, New York; 23, A. D. Granger, New York, delivery at New York City or Colon; 24, The Handlan & Buck Mfg. Company, St. Louis, Mo.; 28, The E. Keeler Company, Williamsport, Pa.; 34, The Manhattan Supply Company, New York; 35, Manning, Maxwell & Moore, New York; 36, The Moran Company, Seattle, Wash., delivery at La Boca; 38, Motley, Green & Co., New York; 40, The New Jersey Foundry & Machine Company, New York; 41, The Odum-Taylor Boiler Company, Memphis, Tenn.; 44, The H. A. Rogers Company, New York; 50, Vermilye & Power, New York; 55, The Gardner-Governor Company, Quincy, Ill.; 56, The Phoenix Iron Works Company, Meadville, Pa.; 57, The James Reilly Repair & Supply Company, New York; 58, The Robb-Mumford Boiler Company, New York; 59, The Atlas Engine Works, New York; 60, The Drew Machinery Agency, Manchester, N. H.

Class 1. One dipper dredge, 5-yd.—Bidder 2, \$127,000, 285 days; 10, \$100,000, 90 days; 16, \$100,000, 240 days.

Class 2. Item 2, 24 horizontal return tubular boilers; item 5, two duplex piston pattern boiler feed pumps—Bidder 6, total, \$65,578, no time stated; 12, part, item 5 only, \$400, 15 days; 14, part, items 2, 3 and 4 only, delivery at New York, \$68,900, 130 days; 17, total, \$60,562.14, 180 days; 23, part, item 2, \$44,745, 198 3-in. tubes charcoal iron, New York delivery, and \$41,548, 198 3-in. steel tubes, New York delivery, and \$43,980, 104 4-in. tubes, charcoal iron, New York delivery, and \$39,500, 104 4-in. steel tubes, New York delivery, and \$54,745, 198 3-in. tubes, charcoal iron, Colon delivery, and \$51,548, 198 3-in. steel tubes, Colon delivery, and \$53,985, 104 4-in. tubes, charcoal iron, Colon delivery, and \$49,000, 104 4-in. steel tubes, Colon delivery; item 5, \$750, New York delivery, and \$780, Colon delivery; 28, total, \$64,567, 210 days; 35, total, \$57,436.28; item 5, \$464.64; alternate on item 5, \$608.30 and \$859.58, 210 days; 36, total, \$90,720, 270 days; 38, part, items 2, 3 and 4, \$58,328, 175 days; 40, total, \$64,742, 200 days; 41 part, except items 5, 6 and 8, \$59,440, 150 days; 50, total, \$68,740, 180 days; 53, part, item 5 only, \$4795, 21 days from factory; 56, total, \$66,418, deduct on item 2, \$600, deduct without any variation or test \$4000, or \$1500 if only first battery is tested, 90 days; 57, total, \$117,705.58, 150 days; 58, total, \$56,686, price on item 4 in above total is \$2688; if stack is made of 1/2-in. and 3-10-in. plate throughout price is \$3050 on this item, 120 days; 59, total, \$60,108.76, 180 days.

Class 3. Two automatic saw grinders—Bidder 17, \$169.80, 25 days; 24, \$165, 20 days; 35, \$149.20, no time stated; 60, \$176.30, 30 days. Awarded to bidder 35.

Class 4. Eighteen hydraulic punches—Bidder 17, \$698.99, 60 days; 24, \$1228, 50 days; 34, \$1283.40, no time stated; 35, \$1139.38, 100 days; 44, \$1113.38, 56 days; 60, \$1215, 70 days.

The following bids were opened November 1 for a 180-hp. boiler for the War and Navy Building, Washington:

Evans, Almirall & Co., New York, \$3037, Babcock & Wilcox boiler.

The Sterling Consolidated Boiler Company, Washington, D. C., \$2498, Sterling boiler.

The Babcock & Wilcox Company, Philadelphia, Pa., \$2875, Babcock & Wilcox boiler.

The following bids were opened November 13 for supplies for the navy yards:

Bidder 3, The Alliance Machine Company, Alliance, Ohio; 20, The Burke Electric Company, Erie, Pa.; 29, Baker & Hamilton, San Francisco, Cal.; 42, The Cleveland Crane & Car Company, Wycliffe, Ohio; 52, The Case Mfg. Company, Columbus, Ohio; 54, The Deane Steam Pump Company, Philadelphia, Pa.; 55, The Diehl Mfg. Company, Elizabeth, N. J.; 56, Dietrick & Harvey Machine Company, Baltimore Md.; 59, The D'Olier Engineering Company, Philadelphia, Pa.; 65, The Fairbanks Company, Baltimore, Md.; 76, The General Electric Company, Schenectady, N. Y.; 77, The A. D. Granger Company, New York; 80, The G. & W. Mfg. Company, New York; 85, The Hendy Machine Company, Torrington, Conn.; 93, Harron, Rickard & McCone, San Francisco, Cal.; 94, Henshaw, Buckley & Co., San Francisco, Cal.; 97, The Ingersoll-Rand Company, New York; 113, T. J. Monginhan & Co., San Francisco, Cal.; 120, Manning, Maxwell & Moore, New York; 125, The

Morgan Engineering Company, Alliance, Ohio; 126, The New Jersey Foundry & Machine Company, New York; 128, The North Penn Iron Company, Philadelphia, Pa.; 129, The National Electrical Supply Company, Washington, D. C.; 135, The Niles-Bement-Pond Company, New York; 137, The Northern Electrical Mfg. Company, Madison, Wis.; 138, The Northern Engineering Works, Detroit, Mich.; 147, Pawling & Harnischfeger, Milwaukee, Wis.; 150, The Pratt & Whitney Company, Hartford, Conn.; 152, The Ricketts Engineering Company, Washington, D. C.; 170, The B. F. Sturtevant Company, Hyde Park, Mass.; 176, The Sprague Electric Company, New York; 191, Vermilye & Power, New York; 195, The Whiting Foundry Equipment Company, Harvey, Ill.

Schedule No. 201.

Class 1. Three electric traveling cranes—Bidder 3, \$21,430; 42, \$24,700; 52, \$20,150; 93, \$19,280; 120, \$22,174; 128, \$21,000; 135, \$17,970 and \$17,425; 138, \$20,095; 147, \$20,000.

Schedule No. 209.

Class 11. One 15-ton hand traveling crane—Bidder 3, \$1395; 42, \$1230; 52, \$1200; 80, \$688; 120, \$885; 126, \$865; 128, \$1054.25; 135, \$1050; 138, \$995; 152, \$1350; 191, \$960; 195, \$950.

Schedule No. 210.

Class 21. One planing machine—Bidder 65, \$4498 and \$4825; 120, \$4700 and \$4750; 135, \$4660; 152, \$4920.

Class 22. Two motor driven pumps—Bidder 54, \$9955.

Class 23. One 60-ton crane—Bidder 3, \$10,585; 42, \$13,800; 52, \$8750; 120, \$10,300; 125, \$10,195; 135, \$9400; 138, \$11,705; 147, \$9650; 195, \$10,800.

Schedule No. 211.

Class 31. One twist drill wet grinder—Bidder 120, \$190.

Class 32. One bench drill—Bidder 150, \$31.

Class 33. One bench lathe—Bidder 150, \$1005.

Class 34. Four screw cutting engine lathes—Bidder 65, \$5079.12; 85, \$4840; 120, \$4900 and \$5300; 135, \$4360; 152, \$3500.

Class 35. One horizontal coring, drilling and milling machine—Bidder 56, \$3250; 65, \$3387; 135, \$6497.

Class 36. One universal sectional hydraulic flanging press—Bidder 65, \$4862 and \$5000; 120, \$4100; 135, \$5474.

Class 37. One three-motor electric traveling crane—Bidder 42, \$3570; 120, \$3653; 128, \$3125; 135, \$3600; 138, \$3690; 147, \$3550; 195, \$4350.

Schedule No. 212.

Class 41. One improved pneumatic artesian well pump—Bidder 97, \$2226 and \$3351.

Schedule No. 213.

Class 55. One heavy upright tubular boiler—Bidder 29, \$550; 77, \$619; 93, \$482; 94, \$568; 113, \$995; 191, \$449.

Schedule No. 220.

Class 102. Three 100-kw. generating sets, with spare parts—Bidder 55, \$21,176.05; 76, \$18,700; 137, \$22,084; 170, \$16,907.65.

Class 103. Four 50-kw. generating sets, with spare parts—Bidder 55, \$22,112.55; 76, \$17,452.55; 137, \$23,078.89; 170, \$16,301.95.

Class 104. Eight 3-kw. gun elevating motor generators, with spare parts—Bidder 59, \$4338.80; 76, \$4,170.50; 137, \$3540.48.

Class 105. Eight 3-kw. gun elevating motor generators, with spare parts—Bidder 59, \$4078.80; 76, \$3874.50; 137, \$3504.

Class 106. Four 25-kw. turret turning motor generators, with spare parts—Bidder 76, \$5271.95; 137, \$5020.82.

Class 107. Four 25-kw. turret turning motor generators, with spare parts—Bidder 76, \$4918.35; 137, \$4942.38.

Schedule No. 224.

Class 152. Two 50-hp. motors—Bidder 20, \$1640; 76, \$1672; 129, \$1694; 176, \$1904.

The following awards have been made for equipment for the power plants at the Charleston and Norfolk navy yards, under bids opened October 13:

Norfolk.

The D'Olier Engineering Company, Philadelphia, Pa., item 12, Northern Engineering Company's crane, \$3900; item 9, Wheeler condensers and piping for condensing equipment, \$26,000.

The Heine Safety Boiler Company, Philadelphia, Pa., for all other work, \$57,178, including Heine boilers, Murphy stokers, Foster superheaters and Sturtevant mechanical apparatus.

Charleston.

C. L. de Muralt, New York, \$83,500 for work complete, the apparatus to be installed to include Atlas boilers, Murphy stokers, Wheeler condensers, Foster superheaters and Sturtevant economizers.

Under bids opened October 2 for machinery for the Isthmian Canal Commission, Circular No. 330, the following awards have been made:

The Prentiss Tool & Supply Company, New York, class 10, one horizontal drill press, \$1065.

Manning, Maxwell & Moore, New York, class 11, three upright drill presses, \$263.25; class 12, three stationary head upright drill presses, \$532.05.

The Fox Bros. Company, New York, class 13, three sliding head upright drill presses, \$1005; class 14, one heavy pattern upright drill press, \$455.

The following awards have been made for supplies for the navy yards, bids for which were opened October 9:

The Cleveland Crane & Car Company, Wilckliffe, Ohio, class 81, one 10-ton crane, \$2510.

Tinius Olsen & Co., Philadelphia, Pa., class 82, one spring testing machine, \$390.

The Niles-Bement-Pond Company, New York, class 83, one Bement slotter, \$2700; class 94, one Bickford full universal radial drill, \$2035; class 95, one horizontal boring and drilling machine, \$2140; class 96, one horizontal boring, drilling and milling machine, \$7735; class 97, one horizontal boring, drilling and milling machine, \$5775; class 102, one triple geared engine lathe, \$3130.

The Pratt & Whitney Company, Hartford, Conn., class 88, one special roller path grinding machine, \$6280.

The Walter H. Foster Company, New York, class 85, one universal grinding machine, \$695.

The Fairbanks Company, New York, class 86, one universal and tool grinding machine, \$799; class 87, one No. 3 drop apron tool grinder, \$274; class 98, two plain milling machines, \$3035; class 106, two Prentice high speed lathes, \$1505; class 114, one foundry cold saw cutting-off machine, \$2575.

James Clark, Jr., & Co., Louisville, Ky., class 92, one motor driven three-spindle drill, \$415; class 93, four motor driven sensitive drills, \$416.

I. A. Johnson, Jr., & Co., Philadelphia, Pa., class 103, one engine lathe, \$6133.

The Hendy Machine Company, Torrington, Conn., class 105, one geared head lathe, \$1050.

S. M. Price Machinery Company, Norfolk, Va., class 89, one belt lacing machine, \$84.75; class 91, one portable electric grinder, \$37.93; class 118, one special air drill, \$135.

Prentiss Tool & Supply Company, New York, class 116, one radius planer attachment, \$75.

H. B. Smith Machinery Company, Smithville, N. J., class 110, one power feed triple drum sander, \$1100.

Garvin Machine Company, New York, class 129, one back geared engine lathe, \$1540.

Under bids opened October 23 for supplies for the navy yards Montgomery & Co., New York, have been awarded class 91, one portable electric drill and two portable electric grinders, \$148.40.

The following awards have been made for supplies for the navy yards, bids for which were opened October 30:

Manning, Maxwell & Moore, New York, class 43, one triple geared engine lathe, \$2955; class 98, one pipe bending machine, \$238.75.

The Niles-Bement-Pond Company, New York, class 46, two lathes, \$3126.

The Pratt & Whitney Company, Hartford, Conn., class 42, one tool makers' lathe, \$527.

The Prentiss Tool & Supply Company, New York, class 49, one universal tool grinding machine, \$825; class 52, one motor driven horizontal boring, drilling and milling machine, \$3020; class 54, one centering machine, \$114.

The Oliver Machinery Company, Grand Rapids, Mich., class 45, one wood turning speed lathe, \$86.50.

William Sellers & Co., Philadelphia, Pa., class 48, one drill grinding machine, \$390.

The Brooklyn Forge & Supply Company, New York, class 50, one portable motor driven bench grinder, \$50.

The Handlan-Buck Mfg. Company, St. Louis, Mo., class 53, one motor driven portable cylinder boring machine, \$499.

The American Woodworking Machinery Company, New York, class 56, one universal tilting table double arbor saw bench, \$570.

The Davis Mfg. Company, Milwaukee, Wis., class 57, one motor driven universal sheet metal cutter, \$375.

M. T. Davidson, Brooklyn, N. Y., class 101, 10 vertical high pressure pumps, \$840.

Under bids opened November 3 James D. Brooks, Washington, D. C., has been awarded contract for pumping machinery for the Norfolk dry dock, at his bid of \$57,575.

Under bids opened November 7 by the Isthmian Canal Commission Henry R. Worthington, New York, has been awarded contract for two duplex steam pumps at \$490.

Under bids opened September 25 for supplies for the navy yards Mitts & Merrill, Saginaw, Mich., have been awarded class 62, one key seating machine, \$965.

The Sharon Steel Hoop Company, Sharon, Pa., is erecting a new steel blooming mill building, 80 x 330 ft., which it expects to finish this year, replacing a wooden building. It has also recently extended its open hearth building to get more room for handling production, installing a crane runway.

CONTENTS.

	PAGE.
The A. S. & W. Double Twin Track Drill. Illustrated....	1361
A Heavy Submarine Cable.....	1362
Morgan Rolling Mill Contracts.....	1362
The American Foundrymen's League.....	1362
The P. & W. Two-Spindle Profiling Machine with Belt Drive. Illustrated.....	1363
The Foundry Supply Association.....	1363
Steel Passenger Cars.....	1363
The National Founders' Association.....	1364
Ore Shipments Diminishing.....	1371
The Hughes Gas Producer. Illustrated.....	1372
The Ontario Iron & Steel Company.....	1373
An Elastic Currency Plan.....	1373
The Manning Cylinder Drain Valve. Illustrated.....	1374
The Mogul Gasoline Engine. Illustrated.....	1375
The Dominion Coal & Steel Companies Dispute.....	1376
Tin Plate in Canada.....	1377
The Coates Surface Grinding Planer Attachment. Illus..	1377
Brittleness in Steel.....	1378
The Commonwealth Steel Company.....	1380
A Notable Steel Tube Shipment. Illustrated.....	1380
Customs Decisions.....	1380
Cananea Copper Developments.....	1381
The Proposed Lake Gulf Ship Channel.....	1381
Editorial:	
The Ore Merchant and the Furnaceman.....	1382
Earning Powers of New Industries.....	1382
The Founders' Association as a Fighting Machine....	1383
Correspondence.....	1384
Copper Production in 1905.....	1384
The Harblson-Walker Refractories Company.....	1384
What Is an Engineer-Constructor?.....	1385
The Birmingham District.....	1388
Smoke Prevention at Pittsburgh.....	1390
British Iron Ore in 1905.....	1390
Personal.....	1390
Winter Weather Checks Ore Shipments.....	1390
News of the Works:	
Iron and Steel.....	1391
General Machinery.....	1391
Power Plant Equipment.....	1391
Foundries.....	1392
Fires.....	1392
Hardware.....	1392
Miscellaneous.....	1392
Buffalo's Outer Harbor to Be Utilized.....	1393
Asbestos in Building Construction.....	1393
The Iron and Metal Trades:	
A Comparison of Prices.....	1394
Chicago.....	1394
Pittsburgh.....	1396
Birmingham.....	1397
Cleveland.....	1398
Philadelphia.....	1399
Cincinnati.....	1399
Metal Market.....	1400
New York.....	1400
Iron and Industrial Stocks.....	1401
New Publication.....	1401
Foreign Commerce Extension.....	1401
A Tidal Power Plant.....	1402
Trade Publications.....	1402
The Machinery Trade:	
New York Machinery Market.....	1403
New England Machinery Market.....	1404
Philadelphia Machinery Market.....	1405
Chicago Machinery Market.....	1406
Government Purchases.....	1406
Hardware:	
Condition of Trade.....	1409
Notes on Prices.....	1410
Trade Winning Methods. Illustrated.....	1413
Pritchard-Strong Company's New Factory.....	1414
Fire in Chicago's Hardware District.....	1414
New York Hardware Jobbers' Association. Portraits..	1414
Letters from the Trade.....	1414
Catalogue File for Hardware Merchants. Illustrated..	1415
Production of Saws and Files.....	1416
Price-Lists, Circulars, &c.....	1417
Requests for Catalogues, &c.....	1417
Preservation of Hickory Timber in the United States..	1418
John G. Rollins & Sons' New Catalogue.....	1418
Enterprise Mfg. Company.....	1418
The Location of Chicopee Falls.....	1418
The Continental Company.....	1418
American Cutlery Company's Fire.....	1418
Exhibits at Hardware Conventions.....	1419
System for the Retailer. Illustrated.....	1421
Among the Hardware Trade.....	1422
Alligator Check Protector and Letter Opener. Illus..	1422
Gay's Combination Screw Driver No. 1. Illustrated..	1422
Electrotype Case. Illustrated.....	1423
Mission Design Chafing Dish. Illustrated.....	1423
The Cronk Garden Mattock. Illustrated.....	1423
Popular Corrugated Pall. Illustrated.....	1423
Glascock Tandem Racer. No. 2. Illustrated.....	1424
Home Steam Washer and Heater. Illustrated.....	1424
Iroquois Trousers Hanger. Illustrated.....	1424
Buffalo Compressed Air Forge No. 21-C. Illustrated..	1425
Sling Carrier with Parallel Pulleys. Illustrated.....	1425
Current Hardware Prices.....	1426

HARDWARE

NEARLY all the State associations of retail Hardware merchants are now making active preparations for the conventions, so many of which will be held during the opening months of 1907. The success which has attended these organizations and the extent to which they have become representative of the trade in their respective States, coupled with the enthusiasm and energy which are characteristic of their management, promise to make the coming annual meetings especially large and influential. The problem which rests upon the officers as to the best methods of making the gatherings useful, so that the membership of the associations will find that their coming together gives them practical help in the conduct of their business, justifying the time and money thus expended, is doubtless receiving careful attention. As a result it may be that something novel in the programmes of such associations will be developed which will add new interest to the meetings and render them increasingly useful.

It is evident, however, that the exhibit feature will hold a prominent place in connection with the conventions. The following associations, indeed, have already made formal announcement of their plans for exhibits on an extensive scale: INDIANA, ILLINOIS, IOWA, MINNESOTA, NEBRASKA, NEW ENGLAND, NEW YORK, OHIO and WISCONSIN. It is not unlikely that other associations whose plans are not as yet matured will also make exhibits by jobbers and manufacturers a more or less important feature of their gatherings. This tendency is interesting and significant, and will be regarded with general approval by the friends of the retail merchant.

If the exhibits made are well arranged and of the right character they may be an important means of educating the merchants in regard to the goods thus shown. This should aid the merchants in enlarging their lines and contribute to their intelligence in explaining the special features of the goods.

The manufacturers and jobbers and their customers will certainly be brought together in a businesslike way, which should have beneficial results on both sides and tend to promote mutual understanding. The manufacturers especially will be enabled more intelligently to realize the retailers' circumstances and more effectively to co-operate with them in furnishing help in the marketing of their goods.

A well conducted exhibition of Hardware articles should be the means by which manufacturers introducing new goods can bring them to the attention of the trade, while at the same time their methods of displaying them and talking them up should be suggestive to the retail distributors. Hints might in this way be obtained in the line of practical salesmanship which should be of service in the selling of many other goods.

At the present time manufacturers, large and small, are doing a good deal in the way of sending men through the country demonstrating the advantages of specialties which they are putting on the market. These State exhibitions would seem to be an opportunity particularly adapted for work of this kind, especially as in some of them the public will be admitted and perhaps a large and miscellaneous attendance thus secured.

From the standpoint of the associations, there is an important advantage in connection with these displays made by manufacturers and jobbers, inasmuch as in this way the associations will receive an income sufficient in many cases to defray the expenses of running the organizations and conducting their annual meetings. This is especially the case as the tendency is to have the exhibitions in public halls, which are for the time being under the entire control of the associations, who realize whatever profit may result, instead of having the profit go into the pockets of the proprietors of the hotels, as has heretofore frequently been the case.

Many manufacturers are doubtless canvassing the question as to what they should do in connection with these exhibitions. The problem is not an altogether easy one, for the making of a display, notwithstanding the very reasonable charge which is usually made for space, is a matter of some expense, while the number of exhibitions, some of which are simultaneous, further complicates the matter. The experience of the past may give some light in this juncture, and we accordingly print in other columns extracts from a number of letters written by manufacturers and jobbers who have made exhibits at these retail conventions in former years. In these letters our correspondents tell frankly how the matter presents itself to them. It is not surprising that there is a difference of opinion in the premises, most of the writers, however, being disposed to regard the matter favorably.

A fundamental principle to be borne in mind by those in conduct of these exhibitions and by those whom they solicit to become exhibitors is that no undue influence should be brought to bear on manufacturers or jobbers, but that they should be left free to exhibit or not to exhibit, as they may deem advisable, on business considerations, without incurring anything like disfavor if they decide against exhibiting and without expecting that they will be regarded with any peculiar favor if they do exhibit. The question should be decided entirely on its merits, apart from any attempt to patronize or curry favor. It is gratifying to be able to report that the State associations, we believe without exception, are presenting the opportunity in this spirit, simply as a business proposition, which those to whom it is afforded are quite free to accept or reject, as they on business principles exclusively may deem advisable.

Condition of Trade.

Business, while continuing in very large volume and on substantially the lines to which we have before referred, naturally shows the influence of the season and the near approach of the holidays and the close of the year. Most of the current orders are for goods needed at once for the replenishing of stocks or the supply of immediate requirements. The extent to which the trade is going into holiday goods and the finer grades of Hardware, and not a few articles which lie aside from the regular Hardware field, finds a constant illustration in the character of orders and in the more attractive appearance of the stores and their increasing volume of sales. The movement toward higher prices continues and advances are frequent. Some of the lines which

thus have moved up are touched upon in the following notes. A scarcity of material is causing most manufacturers more or less trouble, but the difficulty in this regard does not seem to be increasing. Delays on the railroads are the cause of an almost constant annoyance to the shippers and the consignees. If there could be a free and prompt movement of freight it would do much to relieve the situation. The export of Hardware and related lines goes along on a liberal scale, and many of the manufacturers are pursuing a wise course in cultivating foreign trade with persistency and enterprise. A growing volume of business is the result, with the laying of a foundation for a more important trade in the future.

Chicago.

Wire Cloth prices, as established by the manufacturers last week, represent a considerable advance over those prevailing during the past season, and are somewhat higher than generally anticipated by the trade. To the retail trade quotations on Painted Cloth are on the basis of \$1.25, and Galvanized is held at an advance of 50 cents. Large contracts have already been placed by the jobbers, and before the end of the month the entire output of the manufacturers will have been sold. Inasmuch as there was no change in the cost of Fine Wire, the new basis will return a fair profit to the makers. On Poultry Netting last season's discounts were reaffirmed. The continued open weather which has prevailed throughout the West and Northwest has permitted building operations to be carried on without interruption. This in a large measure accounts for the tremendous consumption of Wire products generally, Builders' Hardware and all classes of goods used for building purposes. Wire manufacturers report that sales of Nails during the first 15 days of this month already exceed the bookings in the same period in October, although a rapid decline in new tonnage is now expected, and no revival of demand is anticipated until after the first of the year. Disastrous fires entailing losses aggregating nearly \$500,000 last week almost completely wiped out the plants of several local Hardware manufacturers, and the stock of Builders' Hardware of one of the largest manufacturers in the East was also destroyed.

NOTES ON PRICES.

Wire Nails.—Demand has not been materially affected by the recent advance in prices, except in so far as the trade anticipated its requirements before the advance became effective. Specifications on contracts are coming in so freely that, together with the new business received, mills are not accumulating stocks. Open weather over a large portion of the country has permitted the continuance of building operations. It is understood that the recent advance in price is being maintained by all manufacturers. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	\$1.90
Carload lots, to retail merchants.....	1.95

New York.—Demand keeps up unusually well for the season, there not having been the falling off in requirements since the middle of the month that was anticipated by some in the trade. The following base prices were announced November 21 by New York Jobbers: To retailers, carloads on dock, \$2.00; less than carloads, on dock, \$2.23; small lots at store, \$2.20 per keg. There had been no uniform advance in jobbers' prices since the advance November 10 in mill prices, owing to competition, but jobbers are now endeavoring to realize a fair profit on their sales.

Chicago.—New tonnage shows no appreciable falling off since the recent advance, and orders placed with the mills during the first 15 days of this month compare favorably with the totals of the same period in October. The open weather throughout the West permits building operations to continue without interruption and the consumption is still at a record rate. Mill shipments, notwithstanding the steel shortage and transportation difficulties, are improving slightly, although distributors generally are carrying low stocks. Late official quotations are well maintained, as follows: \$2.05 in car lots to jobbers and \$2.10 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—Demand continues fairly heavy, but is not as active as before the recent advance in prices was made, most of the large trade covering its requirements ahead, before the advance was made effective, and now specifying freely on these contracts. Shipments by the mills are heavy, but these are limited to some extent by the shortage in cars and scarcity of Steel. Stocks at the mills and also in jobbers' hands are reported to be much lighter than usual at this season, showing that Nails are going into actual consumption about as fast as turned out by the mills. The market is very firm, and we are advised that all Wire Nail concerns are rigidly adhering to the higher prices, which became effective recently. We quote Wire Nails at \$1.90 in carloads to the large jobbing trade, and \$1.95 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days.

Cut Nails.—The mills are still behind in shipments, while delays in transportation add to the inconvenience experienced by the trade. The recent advance is alluded to as being fully maintained by members of the Nail Association, while some mills outside the association are asking higher prices. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$1.95; less than carloads, to jobbers, \$2; less than carloads, to retailers, \$2.10. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

New York.—Locally Cut Nails are in good demand and stocks in jobbers' hands are poorly assorted, owing to inability in getting prompt shipments from mill. Sizes most in demand are especially scarce. An advance in price to \$2.20 base for small lots at store, was announced by jobbers on November 21. The market has been irregular for some time, small lots at store ranging from \$2.05 to \$2.10 base, and for popular sizes \$2.15 has sometimes been obtained. Jobbers have concluded that in view of the advance at mill of 5 cents on November 12, a uniform price at store should prevail.

Chicago.—The shortage of the popular sizes of both Steel and Iron Cut Nails grows more pronounced daily, and local distributors are experiencing great difficulty in meeting the demands of their trade. Shipments on many sizes are deferred from one to two months and price advances are shortly anticipated, especially in view of the upward movement of Wire Nails. Quotations are firmly maintained as follows: Steel Cut Nails, in car lots, \$2.05 to \$2.10; less than car lots, \$2.15; Iron Cut Nails, \$2.15 to \$2.20, in car lots; less than car lots, \$2.25.

Pittsburgh.—The Cut Nail Association has made an advance of 5 cents a keg in prices of Cut Nails, or to the basis of \$1.95 for carload lots f.o.b. Pittsburgh. This price affects only the product of the mills in the association, but we can state that mills in the Wheeling District that are large producers of Cut Nails, have been quoting \$2.05 and \$2.10 Pittsburgh, for some time. Official prices, on which, however, premiums of about 10 cents per keg continue to be paid for prompt deliveries, are as follows, f.o.b., Pittsburgh: Carload lots, to jobbers, \$1.95; less than carloads, to jobbers, \$2.00; less than carloads, to retailers, \$2.10. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 and 10 cents advance on Steel Cut Nails.

Barb Wire.—Current orders are comparatively light, but specifications are being received in good volume by the mills. The market is referred to as being fully maintained at the recent advance. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.05	\$2.35
Retailers, carload lots.....	2.10	2.40
Retailers, less than carload lots.....	2.20	2.50

Chicago.—Stocks in the hands of jobbers are moving freely, as the mild weather has permitted outside work in the rural districts to be carried on up to the present time with only slight interruption. The lateness of the season, however, mitigates against the placing of heavy orders with the mills and no pronounced movement is anticipated before the first of the year. Quotations are unchanged, as follows: To jobbers, Chicago, car lots, Painted, \$2.20; Galvanized, \$2.50; to retailers, car lots, Painted, \$2.25; Galvanized, \$2.55; retailers, less than car lots, Painted, \$2.35; Galvanized, \$2.65; Staples, bright, in car lots, \$2.15; Galvanized, \$2.45; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—New demand for Barb Wire is rather light, but specifications on contracts are still being received by the mills in good volume. The general market is very firm and we are advised that all the makers of Barb Wire are strictly adhering to the advanced prices which became effective on November 10, and which are as follows: Painted Barb Wire, \$2.05, and Galvanized, \$2.35, in carload lots to the large jobbing trade, with the usual advance of \$1 a ton to retailers in carload lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Smooth Fence Wire.—Specifications on contract orders are being received in excess of the productive capacity of the mills, while new business is unusually large considering the lateness of the season. The market is firm at the recent advance. Revised quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....\$1.75
Retailers, carloads..... 1.80

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—Specifications on existing contracts continue in excess of production and deliveries consequently show no improvement. The demands of the manufacturing trade are heavier than ever before in the history of the industry and the requirements of the field Fence makers are insatiate. Quotations are firmly maintained, as follows: Jobbers, \$1.90, f.o.b. Chicago, in car lots; retailers, \$1.95.

Pittsburgh.—Considering the lateness of the season, new tonnage being entered is unusually large, while specifications on contracts continue to come in very freely and exceed production of the mills, which are still from two to three weeks behind in deliveries, and on some sizes for a longer period. The market is very firm and we are advised that the advanced prices which went into effect on November 10 are being rigidly held. These prices are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....\$1.75
Retailers, carloads..... 1.80

The above prices are for base numbers, 6 to 9.

Crowbars and Wedges.—Steadily advancing prices on raw material are reflected in the quotations of several manufacturers of Crowbars and Wedges, who have advanced their product about \$2 per ton.

Box Straps.—Within the past week all leading manufacturers of Box Straps have made advances in their prices of from 10 to 15 per cent. The movement is a reflection of increased manufacturing costs and is in sympathy with the trend of all allied lines.

Wire Cloth.—The announcement of the price on Wire Cloth which the trade has been awaiting with interest for about a month was made the last of last week. As is generally understood, conditions under which this staple commodity was marketed last year were very unsatisfactory from the producers' point of view, and it is doubtful if the prices obtained in the stress of competition represented even a fair margin of profit. As the

present season opens an effort has been made to improve the situation, and the market starts at a considerably higher level, which in the opinion of manufacturers should be represented to the retail trade by a price on regular 12-mesh Painted Cloth of \$1.25 per 100 sq. ft. It is also announced by the manufacturers, most of whom are apparently acting in harmony, that their prices are offered only on such orders accompanied by specifications as they may be able to accept for delivery prior to February 1, 1907. They also state that they will accept no unspecified contracts as they have formerly done. In view of the fact that the leading producer of raw material used in making Wire Cloth is exerting a strong influence on the situation, it is believed that these stipulations will insure the stability of the market, and they are referred to as preparing the way for an advance in Wire Cloth should it be justified by conditions a little later in the season. On Hardware grade Cloth, standard, galvanized, Nos. 2, 2½ and 3 mesh, an advance is announced amounting to ¼c. per square foot.

Bolts, Carriage, Machine, Etc.—The enormous con-week prices have again been advanced, the following being the quotations named for retail merchants, although it is probable that jobbers will shade these figures for a time:

Common Carriage Bolts, ¾ x 6, smaller and shorter, cut thread.....	70 and 12½ %
Common Carriage Bolts, longer or larger than ¾ x 6.60 and 2½ %	
Machine Bolts, ¾ x 4 or shorter and smaller, with H. P. or C. P. Plain Nuts, cut thread.....	70 and 12½ %
Machine Bolts with H. P. or C. P. Plain Nuts, larger or longer than ¾ x 4.....	60 and 7½ %
Machine Bolts, all sizes, with C. and T. Nuts.....	60 %
Machine Bolts, ¾ x 4, smaller and shorter, without Nuts, with cut threads.....	75 and 5 %
Machine Bolts, other sizes, without Nuts, 6 in. and shorter.....	65 and 5 %
Machine Bolts without Nuts, longer than 6 in.....	65 %
Machine Bolt Blanks.....	60 and 7½ %
Bolt Ends, with H. P. or C. P. Plain Nuts.....	60 and 7½ %
Bolt Ends, with C. and T. Nuts.....	60 %
G. P. Coach Screws.....	75 and 5 %
Cone Point Lag Screws.....	75 and 10 %
Forged Set Screws and Tap Bolts.....	50 and 5 %

Regarding their terms of payment which manufacturers of Bolts and Nuts recently altered to 30 days, net; 1 per cent, 10 days, it is authoritatively stated that these terms are now strictly enforced on their business and that there will be no weakening or deviation from them. The terms are, we are advised, unanimously and sumption of all kinds of Carriage and Machine Bolts still continues. Although the market has for some time been regarded as on a fairly high level, leading manufacturers are unanimous in stating that they are absolutely unable to take care of the business pouring in upon them. This emphatically reaffirmed.

Hatchets.—Merchants regularly purchasing Hatchets from manufacturers who have for some time been acting in harmony have received notice to the effect that the rebate system by which the market has been regulated is discontinued. It is understood, however, that this change does not represent an advance in the price of Hatchets, as the amount formerly rebated will be credited in a more direct way. The trade will remember that as originally offered the rebate was conditional on merchants favoring members of the association with their entire business in this line, but the stipulation was withdrawn some months ago while the rebate has since been generally continued.

Sheet Zinc.—Under date of November 17 an advance in Sheet Zinc is announced, the price now being \$8 per 100 lb. in 600-lb. casks of the thicknesses from Nos. 9 to 22, inclusive, and of the widths from 32 to 58 in., and of the lengths from 72 to 96 in., f.o.b. mill. This price is subject to the following discounts:

	Cash with order.	Quantity.	Total.
	Per cent.	Per cent.	Per cent.
Carload lots.....	3	5	8
9000-lb. lots.....	3	3	6
6000-lb. lots.....	3	2	5
3000-lb. lots.....	3	1	4
Less than 3000 lb.....	3	0	3

Wrought Door Bolts.—A change in Wrought Door Bolts occurred this week, leading manufacturers advancing their quotations about 10 per cent. Wrought Barrel Japanned Bolts, Wrought Barrel Bronzed, Spring, Shutter, Square and Square Neck Bolts are included in this class. The movement is, of course, a reflection of the market on all Wrought Steel and Iron Goods which, because of advances in labor and raw material, are undoubtedly costing considerably more to produce than they did early in the year.

Planes.—Several of the leading manufacturers of Iron Planes have just marked up their quotations about 5 per cent. The market on this line may now be represented in a general way by a discount of 60, 10 and 5 per cent.

Steel and Iron Squares.—The manufacturers of Steel and Iron Squares have advanced the price of this line to 75 per cent. discount for one case of four dozen, 70 and 7½ per cent. in less quantity than a case, orders for five cases and over obtaining a lower price. One of the conditions now required is that all contracts must contain specifications and date of shipment when order is given, for shipment at these prices not later than February 1.

Coat and Hat Hooks.—An advance in the price of Wire Coat and Hat Hooks amounting to about 10 per cent. was announced this week by several manufacturers. If jobbers should immediately change their prices to correspond with the new level of the market, a fair quotation to retail merchants would be 75 per cent. discount. It is probable, however, that for a time, at least, orders can be placed on somewhat better terms, as jobbers are carrying stocks bought at considerably lower prices.

Galvanized Ware.—Quotations on Galvanized Ware and also on the various classes of Tinware are now based on the low list referred to some time ago in these columns, which has been pretty generally circulated among the trade. The present market to retail merchants on Galvanized Pails and Tubs may be fairly represented by a discount of 10 and 7½ per cent. from this list and on Coal Hods by a discount of 10 and 5 per cent.

Dripping Pans.—The scarcity of sheets and the upward tendency of the market has been reflected in an advance in Dripping Pans, which are now quoted at 65 and 7½ per cent. discount to good retail buyers.

Washers.—While the market for Wrought Iron or Steel Washers is still an open one, it has recently evinced a much firmer tendency, due to the enormous demand for these goods and the difficulty of manufacturers in keeping up with their orders. Advances are not at all uniform, but have been general during recent weeks and prices to retail trade are not now based on better than 5.60 to 5.80 off list.

Hot Pressed Nuts.—The following prices on Hot Pressed Nuts were announced to-day (Wednesday):

	Off list.
Hot Pressed, Blank, Square.....	5 c.
Hot Pressed, Blank, Hexagon.....	5.40c.
Hot Pressed, Tapped, Square.....	4.70c.
Hot Pressed, Tapped, Hexagon.....	5.10c.

Cold Punched Nuts.—The following prices on Cold Punched Nuts were announced to-day (Wednesday):

	Off list.
Cold Punched, plain, blank, square.....	4.80c.
Cold Punched, plain, blank, hexagon.....	5.10c.
Cold Punched, C. T. & R., blank, square.....	5.10c.
Cold Punched, C. T. & R., blank, hexagon.....	5.70c.
Cold Punched, plain, tapped, square.....	4.80c.
Cold Punched, plain, tapped, hexagon.....	5.10c.
Cold Punched, C. T. & R., tapped, square.....	5.10c.
Cold Punched, C. T. & R., tapped, hexagon.....	5.70c.

Cutlery.—Landers, Frary & Clark, New Britain, Conn., have just advanced their prices on cheaper grades of Table Cutlery, known in the trade as Gross Goods, about 5 per cent. It is understood that other manufacturers are making or contemplating a similar move. As stated last week in these columns this market has not up to this time participated in the general strength of Hardware products and prices are still referred to as low and unremunerative to the manufacturers.

Poultry Netting.—Coincident with the announcement of the price on Wire Cloth discounts were also given out by manufacturers of Galvanized Wire Netting, many of

whom are important producers of both lines. The stipulations regarding specifications and date of delivery explained in the paragraph referring to Wire Cloth will also be applied to Poultry Netting, but there is practically no change in the market which may be represented in a general way by a discount of 80 and 10 per cent.

Rope, Etc.—In most instances the demand is regarded as excellent by manufacturers. The advance in Manila Fibers has stimulated specifications on contract orders, which had been placed at lower prices. As Jute Rope has advanced in price, Sisal Rope has come into better demand. The best quality of pure Manila Rope is quoted at an advance of ½ to ¾ cents above the ordinary grade, as given below: New York quotations are as follows: Pure Manila, 12½ to 13 cents; B quality, 11½ to 12 cents; Pure Sisal, 9¼ cents; No. 2 quality, 8 cents; No. 1 Jute, ¼ in. and up, 8¼ to 8½ cents; No. 2 Jute, 7¼ to 8 cents per pound. Cotton and Hemp Twines, also Russia and India Hemp Sash Cord, are particularly strong and higher in price.

Linseed Oil.—Two advances of 1 cent per gallon, respectively, have taken place on all grades of both Raw and Boiled Oil during the week under review. Seed has advanced during the past two or three weeks as the result of export demand and because of the large purchases made by domestic crushers to cover winter and early spring requirements before navigation closed. The extra cost for freight per bushel of Seed by rail over lake transportation would be 8 cents per bushel. It rather appears that crushers have put up the price of Seed on themselves by their haste to purchase Seed, against which they have taken no orders for Oil. Buyers have not followed the market, as few contract orders have been placed above the base of 35 to 36 cents for out of town Raw. Delays in transportation are making it difficult for jobbers to supply customers promptly with Oil. The Seed market declined 2 to 3 cents on November 20, without affecting Oil prices. New York quotations are as follows, according to quantity: City Raw, 42 to 43 cents per gallon; out of town Raw, 41 to 42 cents per gallon. Boiled Oil is 1 cent per gallon over Raw.

Spirits Turpentine.—The local market has continued without change in prices, while demand has been restricted to jobbing lots, as buyers are inclined to believe that the Savannah market is being influenced by speculative movements. It is reported that the American Naval Stores Company, recently chartered in West Virginia with a capital and surplus of \$1,750,000, will on November 30 succeed to the business of S. P. Shotter Company and the Patterson-Downing Company, two of the representative naval stores export concerns. New York quotations are as follows, according to quantity: Oil Barrels, 70½ to 71 cents; Machine Made Barrels, 71 to 71½ cents per gallon.

Window Glass.—According to reports the central selling agency, to be known as the National Brokerage Company, with offices at Pittsburgh, Pa., is assured. This company will sell the entire output of about 2100-pot capacity out of a total capacity of 2400 pots in this country, including that of the American Window Glass Company. The officers of the company are given as follows: J. A. Chambers, president; J. R. Johnston, vice-president; H. B. Van Cleve, secretary and treasurer. The Executive Committee is said to have made an advance in prices from manufacturers' list, as follows: Single strength, 90 and 5 per cent. discount; double strength, 90 and 10 per cent. discount. Another advance is anticipated when all the details of the organization have been completed. The formation of the selling agency has been a gigantic undertaking and one involving much patience and labor on the part of the committee, as the diversified interests of each factory had to be dealt with separately. The object of the organization is to have the product of all factories party to the agreement sold at the same price and to eliminate cutting of prices. Jobbers in New York have made no change in prices as yet, but will do so as soon as the Brokerage Company announces another advance. Jobbers' quotations, from jobbers' list, October 1, 1903, are as follows: Greater New York, single, 90 and 10; double, 90 and 15 per cent. discount.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

ASHEVILLE HARDWARE COMPANY'S WINDOW.

FOR the photograph of the striking window display reproduced herewith we are indebted to the Asheville Hardware Company, Asheville, N. C. While this exhibit covers many lines, the company makes it a rule, and believes it the best practice, to confine its window displays to one line of goods. In this case the fact that

featured, prices being frequently given. On the back of cover is a handy telephone card. The upper left-hand corner of the catalogue is punched with a hole for hanging up, and a dainty pencil is supplied for noting calls.

AN EFFECTIVE MEMORANDUM BOOK.

THE E. R. MOSES MERCANTILE COMPANY, Great Bend and Holsington, Kan., has found a neat pocket memorandum book a very effective means of advertising its business. These are issued with the company's best wishes about the first of the year. During the past two years the company has distributed from 10,000 to 15,000 of these little books each year. The company's mailing list is prepared from various sources, but most of the names are obtained from the assessment lists of the tax



Asheville Hardware Company's Window.

the company had lately broken away a brick column which had formerly separated two windows and made one large window of the whole space, was responsible for the miscellaneous exhibit, as it was thought desirable to have the initial display in the enlarged space more representative than usual of the stock carried by the house. In addition to the lines shown in the photograph Guns, Rifles, Hunting Coats and other goods of a sporting character were featured on side of window.

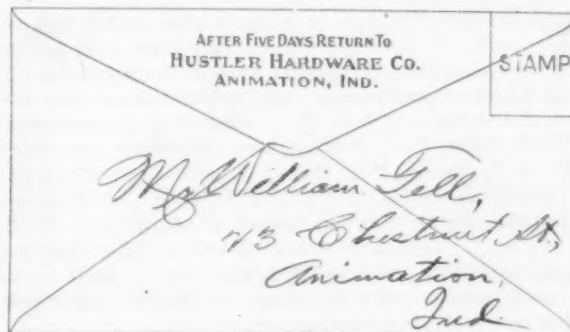
The back of the window consists of a large framework of wood covered with red cloth to which were attached Hardware articles forming letters for the wording "If It's Hardware We Have It" and "If We Have It It's the Best." This has been the motto of the house for a number of years. It will be observed that the same expressions appear just below the ceiling of the window on a permanent painted sign. The latter is transparent, and just wide enough to cover the reflectors and electric lights at the top with which the window is illuminated. The window arrangement attracted a great deal of attention both for the general makeup and because of the lettering, which presented something of a puzzle, not a difficult one, of course, but sufficiently interesting to induce many observers to spell out the letters and thus emphasize the completeness of the company's stock and its reliable quality. It will be noticed that where the same letter is used more than once in the motto a different item of Hardware is employed to represent it.

An attractive and well-printed catalogue of 40 pages was lately issued by Scarborough & Klauss, 3809 Fifth avenue, Pittsburgh, Pa., in which a few selections from their large line of Hardware and House Furnishings were

assessors. The company also gets out a good many circular letters, does considerable newspaper advertising, and with personal canvassing, coupled with fair and square treatment of customers and a guarantee which is lived up to in every respect, loses but few of its old customers, while making many new ones.

A UNIQUE ENVELOPE.

IN the mails the other day we received a letter contained in an envelope of rather unusual character, the address and customary printed instructions to post-



A Unique Envelope.

master in case of nondelivery appearing on the back instead of the face of the envelope. The back was occupied with an advertising announcement. We are not

advised whether or not this envelope resulted from error or accident on the part of the printers, but in any case it contains an idea which may perhaps be used to advantage by retail merchants. Just how the envelope might look as sent out by an enterprising retailer is illustrated herewith.

PRITCHARD-STRONG COMPANY'S NEW FACTORY.

PITCHARD-STRONG COMPANY, Rochester, N. Y., manufacturer of Prisco Lanterns, Bread Mixers and other Hardware specialties, is just completing a large new factory building, which it expects to occupy about December 1. This addition, which will double the productive capacity of the plant, was necessitated by the rapid expansion of the company's business and the increased demand for its goods. The new building has two stories and a basement, with a total floor space of 66,000 sq. ft., which, with the 40,000 ft. in the old factory, gives an area of nearly 110,000 sq. ft. A space in the new building, 40 x 75 ft. in size, has been set apart for offices.

The structure is of slow burning construction and so substantial that the floors will sustain a weight of 1000 lb. to the square foot. Thus the heaviest sheet metal machinery may be installed at any point without danger of vibration. There is also on every floor, including the basement, a fireproof vault for dies and tools. Upward of 400 men will be employed in the new building alone, making close to 700 hands in the entire plant.

The company manufactures all its own electricity for power and heating purposes, and its plant is heated by what is known as the Van Auken vacuum system, which utilizes exhaust steam from the engines. The boilers are of the Scotch marine type, 400 hp. in capacity, fitted with Jones underfeed stokers which automatically feed the furnaces. This keeps the chimneys smokeless and at the same time affords very cheap fuel. The shipping facilities of the company are unusually good. Its railroad switch is a direct spur from the New York Central Railroad, running into its factory in close connection with the East Rochester freight yards, where trains are made up and broken, so that the company is able to obtain a car almost any size within an hour or two after notice is given, provided freight traffic is normal and there is not a car famine, which has been so often the case during the past season. Shafting, pulleys, hangers, &c., are of the latest and most improved pattern, with automatic oiling devices, and the plant is also equipped with a fuel oil system for producing heat for the various purposes of manufacturing.

With its facilities so greatly enlarged the company will not only increase its production of goods, already widely and favorably known, but will also add a number of new lines in the way of extra heavy nonrusting Tinware and nickel plated Copper Ware, embodying original designs and patented improvements, which it is believed will be well received by the trade and the consuming public.

FIRE IN CHICAGO'S HARDWARE DISTRICT.

A DISASTROUS fire entailing a loss of \$300,000 occurred in the center of Chicago's Hardware jobbing and manufacturing district on Friday, November 16. P. & F. Corbin, manufacturers of Builders' Hardware, sustained the heaviest loss, the display and warerooms at 104-106 Lake street having been completely destroyed. The A. C. Barler Mfg. Company, maker of Oil Stoves, occupied the second story of this building, and its manufacturing department was completely wiped out. Stocks of the F. P. Smith Wire & Iron Works and the American Whip Company, 102 and 104 Lake street, as well as the Geo. E. Watson Paint Company, at No. 108, were damaged by water and smoke.

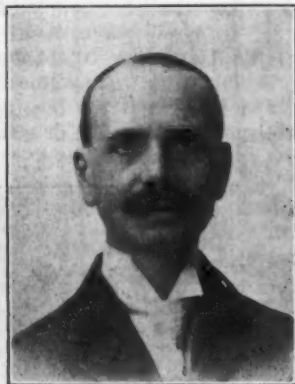
By purchasing the interest of the late August Erath, the Voorhies Hardware Company has acquired the Hardware, Stove, Paint, Plumbing and Sporting Goods business formerly conducted by the Erath Hardware Company.

NEW YORK HARDWARE JOBBERS' ASSOCIATION.

THE annual meeting of the New York State Association of Hardware Jobbers was held last week at the Eagle Hotel, Kingston, N. Y. The following officers were elected for the ensuing year: President, Arthur J. Lowery, Utica; vice-president, E. C. Neal, Buffalo; secretary-treasurer, Joseph Born, 210 South Clinton street, Syracuse; directors, Hobart Weed, Buffalo, and Irving D.



ARTHUR J. LOWERY,
President.



JOSEPH BORN,
Secretary-Treasurer.

Booth, Elmira. Mr. Lowery, the new president, who filled the position of vice-president during the past year, is secretary and treasurer of the Wright-Dana Hardware Company of Utica, a business establishment more than a century old. Mr. Born has been secretary-treasurer of the association for several terms.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

CHARGE UP BORROWED TOOLS.

FROM A HARDWARE HOUSE IN ILLINOIS: In reply to a North Carolina merchant's inquiry in *The Iron Age*, 15th inst., we wish to state that we solved the question of loaned tools long ago. We simply charge the things borrowed, and if not returned within 30 days we will not receive them, but send a bill and collect. If the bill is not paid upon presentation all manner of accommodation is off. This works well with us and we have no trouble. In fact, we have our "accommodation" severely respected and are liberal and generous, too. We have an experience of 58 years, 50 years at the present stand, which we built for our own use. Try this method, friend. It will surprise you how the Screw Drivers and Monkey Wrenches come back.

The Hardware and plumbing establishment of William H. Vaught, Rankin, Pa., was totally destroyed by fire a short time since. The loss on the building was \$2500 and on the stock, \$5000.

A. L. Johnson, for several years buyer and general manager of Morsell's Hardware Store, Washington, D. C., has purchased the business and will conduct it in the future on his own account.

The Stambaugh-Thompson Company, Youngstown, Ohio, has acquired the business of the Morris Hardware Company of the same city for a price said to be \$341,000.

S. I. Major & Co. have purchased the business of Thieman Hardware Company, Leeton, Mo.

CATALOGUE FILE FOR HARDWARE MERCHANTS.

THE IRON AGE has received many inquiries from hardware merchants for a practical method of keeping trade catalogues, efficient and comprehensive enough to meet the requirements of a growing business.



Fig. 1.—Catalogue Filing Case.

but not too complicated for the facilities of the average retailer. H. W. Mills & Co., Paterson, N. J., have perfected a system which has proved satisfactory to them and which we are permitted to describe by courtesy of this enterprising concern. The case which they had built to accommodate their catalogues is illustrated in

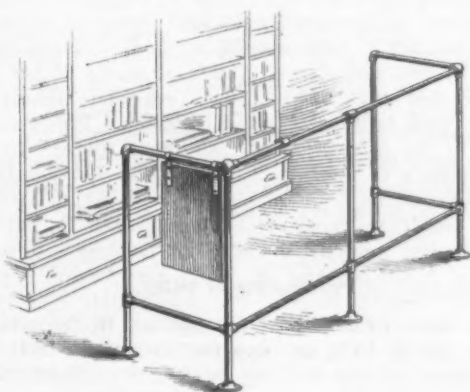


Fig. 2.—Rail and Shelf Adjoining Catalogue File.

Fig. 1. It is 7 ft. high, 4½ ft. wide and 1 ft. deep, outside measurements. It is divided, as will be seen, into compartments, some of which are alphabetically and some numerically designated by stencils.

The Lettered Compartments

are of equal size, 7 in. wide by about 6 in. high, and form corresponding rows on each side of the case. Be-

cause of the infrequent use of some of them it was found practicable to group together in the same compartment the letters J and K, Q and R, and Y and Z, while under S it was necessary to have two spaces, designated at S-1 and S-2, respectively. These compartments form a complete alphabetical file, affording space for all circulars, booklets, price-lists and small catalogues and making them immediately accessible for examination and reference.

The Numbered Compartments

form two rows in the center of the case, having adjustable shelves which can be arranged to meet requirements after grouping the large bound catalogues according to size. For convenience the books kept in these shelves are numbered consecutively, a separate series being used for each shelf; thus each catalogue has beside the shelf number a serial number denoting its position on the shelf. The two drawers at the bottom of the case are used for keeping duplicates which may be useful and for rolls, loose sheets or prints that cannot be folded, and the like.

Railing and Shelf.

As the catalogue file stands on the main floor of the store, a railing has been built in front of it, the position of which is indicated in Fig. 2. This protects the case and prevents piling up goods or packing cases in front of it, where they would interfere with its use. The rail is made of ordinary galvanized pipe about 1¼ in. in diameter and has on one end a wooden shelf hung by two iron straps, forming hinges. This affords a convenient place on which to rest and open catalogues. When not in use it may be left hanging out of the way, as shown in the cut; otherwise it is turned up so as to rest on the projection which will be noted on the top of the adjoining rail.

Index.

An index to the catalogue case is written with the typewriter on large sheets of paper, which are attached to the inside of the doors with thumb tacks, as shown in Fig. 1. The appearance of the index and the method of using it in locating catalogues will be clear from the portion reproduced below:

	Shelf No.	Catalog No.
American Axe & Tool Co.	11	23
American Can Co.	A	
American Fork & Hoe Co.	2	7
American Iron & Steel Co.	10	14
American Radiator Co.	11	30
American Screw Co.	A	
American Wringer Co.	11	27

While this index answers nearly all practical requirements, the firm is now preparing a card index with cross reference cards which will make it possible to refer to different manufacturers under kinds of goods as well as under their firm titles.

W. H. Sterling, Marion, Iowa, has sold his Hardware business to W. H. H. Bonebrake & Son.

J. R. Ralley & Son have succeeded to the Hardware business of Ralley Hardware Company, Waco, Texas.

Johnson Hardware & Lumber Company has bought the Hardware, Stove, Paint and Sporting Goods business of J. Rusho, Taylor, Neb.

The Wright Hardware Company has removed from San Leandro, Cal., to 712 Ninth avenue, San Francisco.

PRODUCTION OF SAWS AND FILE.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, November 20, 1906.

THE Census Bureau has compiled the statistics covering the production of Saws and Files in 1905 as compared with 1900. The figures relating to the two articles have been returned separately so that it is possible to present a pretty accurate statement concerning the output and the geographical distribution of both in-

When it is remembered that the increase in the value of the product of the combined industries of the United States in 1905 was less than 30 per cent., the gain in the manufacture of Saws will be appreciated. It is interesting in this connection to note that the value of the output of Saws in 1890 was only \$5,572,992, while in 1880 it was but \$3,943,905. It is therefore apparent that the gain during the last five years has been greater than during the twenty years from 1880 to 1900.

The table herewith shows the details of the returns for the United States and for all the States in which three or more establishments were reported.

Saw Production in the United States in 1900 and 1905.

UNITED STATES.		CALIFORNIA.		CONNECTICUT.	
1905.	1900.	1905.	1900.	1905.	1900.
Establishments	83	5	4	3	
Capital	\$11,287,816	\$293,346	\$157,097	\$307,172	
Wage earners.....	4,650	82	48	70	
Wages	\$2,707,423	\$57,218	\$34,457	\$45,211	Not separately reported.
Miscellaneous expenses.....	\$1,023,943	\$22,969	\$15,040	\$28,465	
Materials	\$4,035,530	\$35,778	\$31,406	\$57,824	
Product	\$9,819,787	\$175,215	\$102,857	\$212,245	

ILLINOIS.		INDIANA.		MICHIGAN.	
1905.	1900.	1905.	1900.	1905.	1900.
Establishments	9	4	4	7	9
Capital	\$929,942	\$2,025,750	\$1,181,124	\$116,178	\$108,845
Wage earners.....	425	972	647	52	51
Wages	\$289,757	\$577,755	\$346,743	\$28,135	\$28,120
Miscellaneous expenses.....	\$146,398	\$316,146	\$145,736	\$7,491	\$5,774
Materials	\$511,999	\$985,299	\$707,325	\$53,919	\$48,684
Product	\$1,080,849	\$2,350,212	\$1,590,305	\$111,767	\$112,863

MISSOURI.		NEW JERSEY.		NEW YORK.	
1905.	1900.	1905.	1900.	1905.	1900.
Establishments	3	4	4	18	17
Capital	\$312,390	\$571,283	\$847,255	\$689,397	
Wage earners.....	174	140	519	273	
Wages	\$109,144	\$67,221	\$231,533	\$128,574	
Miscellaneous expenses.....	\$20,115	\$14,974	\$100,294	\$20,479	
Materials	\$147,777	\$58,591	\$378,579	\$209,353	
Products	\$432,873	\$235,352	\$978,800	\$433,885	

OHIO.		PENNSYLVANIA.		TENNESSEE.	
1905.	1900.	1905.	1900.	1905.	1900.
Establishments	7	10	12		8
Capital	\$349,754	\$4,747,288	\$4,002,089		\$20,420
Wage earners.....	162	1,837	1,411		15
Wages	\$114,881	\$1,024,539	\$734,612		\$8,547
Miscellaneous expenses.....	\$35,694	\$217,714	\$75,926		\$4,917
Materials	\$125,021	\$1,367,200	\$996,464		\$9,113
Product	\$386,323	\$3,323,455	\$2,499,611		\$36,996

WASHINGTON.		ALL OTHER STATES.	
1905.	1900.	1905.	1900.
Establishments	4	16	17
Capital	\$138,103	\$1,533,028	\$253,436
Wage earners.....	21	510	114
Wages	\$14,300	\$323,794	\$58,904
Miscellaneous expenses.....	\$8,157	\$140,615	\$11,664
Materials	\$23,768	\$493,143	\$96,760
Products	\$83,538	\$1,167,383	\$239,780

dustries. As in the case of all census reports, the establishments here classified are those in which more than 50 per cent. of the product is of the article named. Very substantial gains have been made in the manufacture of both Saws and Files in the past five years and the industries engaged in their production have shared fully in the general prosperity of the country.

Production of Saws.

The returns for 1905 show 83 establishments engaged in the manufacture of Saws, as compared with 96 in 1900. This decline is in line with the general tendency toward consolidation reflected in the great majority of the industrial reports which the Census Bureau is now gathering. The capital in 1905 was \$11,287,816, as compared with \$8,505,487 in 1900. In 1905 there were 4650 wage earners receiving \$2,707,423 in wages compared with 3,212 wage earners receiving \$1,692,757 in 1900. It will be noted that the increase in wages has been much greater than that in the number of wage earners reported, showing a higher scale throughout the industry. The miscellaneous expenses of the industry in 1905 aggregated \$1,023,943, as compared with \$347,209 in 1900. The large increase in this item is also characteristic of many contemporaneous census reports and is attributed chiefly to higher rentals and an increased expenditure for advertising, travellers' expenses, &c.

The total cost of materials in 1905 was \$4,035,530, as compared with \$2,600,217 in 1900. The aggregate value of the products of the industry in 1905 was \$9,819,787, as compared with \$6,443,748 in 1900. The increase in the cost of materials was therefore 54 per cent. while the increase in the value of the output was 52 per cent.

From the table given it will be seen that Pennsylvania leads the industry engaged in the production of saws, the establishments in this State turning out in 1905 33 per cent. of the production of the United States. The gain made by the establishments in this State was only 33 per cent., as compared with 1905, however, while that for the country at large was 52 per cent. Indiana ranked second in 1905 and showed a gain of nearly 50 per cent., as compared with 1900. New York and Illinois also showed very large proportionate gains. The great increase in the production of "all other States" in 1905 is due largely to the fact that Missouri, New Jersey and Tennessee, which were separately reported in 1900, returned less than three establishments each in 1905 and were therefor aggregated under the heading referred to.

Production of Files.

There were 62 establishments engaged in the manufacture of files in 1905, as compared with 86 in 1900. The total capital of the industry in 1905 was \$5,866,256, as compared with \$3,857,647 in 1900. The increase in capital, however, is not proportionately reflected in the other items of the returns. The number of wage earners employed rose from 3160 to 3276 and the wages paid from \$1,277,199 to \$1,514,412, showing a materially higher rate of compensation, but a very small increase in the number of operatives in the industry. Miscellaneous expenses rose from \$229,076 to \$408,618, but the increase in the cost of materials was proportionately less, the total in 1905 being \$1,310,978, as compared with \$1,166,414 in 1900. The value of the product in 1905 was \$4,391,745, as compared with \$3,403,906, a gain of 29 per cent. The value of the product in 1890 was \$3,179,649 and in 1880

\$2,486,533. As in the case of the manufacture of saws, the actual gain in the production of files in 1905 over 1900 equalled the increase in the 20 years from 1880 to 1900. The accompanying table shows the details of the industry for the United States and for those States reporting three or more establishments in 1900.

File Production in the United States in 1900 and 1905.

UNITED STATES.			CONNECTICUT.			ILLINOIS.		
1905.	1900.		1905.	1900.		1905.	1900.	
Establishments	82	86	4	4		3	3	
Capital	\$5,866,256	\$3,857,647	\$19,089	\$18,928		\$76,360	\$53,908	
Wage earners	3,276	3,160	26	24		81	63	
Wages	\$1,514,412	\$1,277,199	\$12,453	\$11,140		\$37,826	\$22,608	
Miscellaneous expenses	\$408,638	\$229,076	\$1,491	\$1,390		\$16,597	\$3,511	
Materials	\$1,310,978	\$1,166,414	\$2,472	\$3,503		\$14,160	\$13,165	
Products	\$4,391,745	\$3,403,906	\$25,430	\$27,209		\$81,833	\$62,920	
MASSACHUSETTS.			MISSOURI.			NEW JERSEY.		
1905.	1900.		1905.	1900.		1905.	1900.	
Establishments	8	11	3	3		8	8	
Capital	\$165,728	\$50,575		\$9,635		\$1,505,804	\$80,877	
Wage earners	92	75		10		707	83	
Wages	\$41,640	\$39,492	Not separately reported.	\$4,200		\$340,703	\$44,955	
Miscellaneous expenses	\$13,945	\$4,474		\$759		\$93,607	\$5,719	
Materials	\$39,128	\$12,793		\$2,139		\$288,405	\$27,334	
Products	\$120,175	\$86,563		\$22,040		\$969,389	\$104,900	
NEW YORK.			OHIO.			PENNSYLVANIA.		
1905.	1900.		1905.	1900.		1905.	1900.	
Establishments	15	17	5	9		8	14	
Capital	\$181,030	\$226,379	\$20,971	\$219,079		\$1,367,957	\$1,650,414	
Wage earners	159	163	55	308		953	1,149	
Wages	\$92,638	\$78,934	\$23,376	\$119,431		\$389,554	\$445,045	
Miscellaneous expenses	\$11,558	\$10,086	\$5,259	\$4,063		\$108,543	\$111,768	
Materials	\$59,431	\$49,688	\$9,958	\$104,183		\$394,899	\$457,756	
Products	\$222,867	\$192,917	\$55,467	\$257,330		\$1,127,227	\$1,236,436	
RHODE ISLAND.			ALL OTHER STATES.			1905.	1900.	
1905.	1900.		1905.	1900.		1905.	1900.	
Establishments			6	11			11	
Capital			\$1,157,678	\$2,529,317			\$391,174	
Wage earners			846	1,203			439	
Wages	Not separately reported.		\$371,980	\$571,222			\$139,414	
Miscellaneous expenses			\$65,444	\$157,638			\$21,862	
Materials			\$358,993	\$502,525			\$136,860	
Products			\$1,033,838	\$1,789,357			\$379,753	

Pennsylvania led the industry engaged in the manufacture of files in 1905, producing 25 per cent. of the output of the United States, but showing a loss of 9 per cent., as compared with the production of the State in 1900. New Jersey forged rapidly to the front in 1905, the production increasing from \$104,900 to \$969,389, or about 800 per cent. The enormous proportionate growth of the industry in New Jersey in 1905 is the most significant feature of the Bureau's report. There is reason to believe, however, that if the returns for Rhode Island were separately tabulated they would show that State in the second rank and leading New Jersey. In 1900 Rhode Island reported six establishments with a production of \$1,033,838, but during the next five years three small establishments were closed. To avoid disclosing individual operations the three remaining establishments are grouped under the head of "all other States," although it is believed their combined output in 1905 exceeded that of the entire State in 1900. W. L. C.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our catalogue department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

REYNOLDS REFRIGERATOR COMPANY, Omaha, Neb.: Booklet referring to Crystal Refrigerators, explaining the scientific principles of construction, insulation, circulation, drainage and the advantages of the material used, which is galvanized iron.

IWAN BROTHERS, Streator, Ill.: Booklet entitled "Easy Digging," referring to Iwan's patent improved Posthole and Well Augers.

KNIGHT & THOMAS, INCORPORATED, Boston, Mass.: Booklet devoted to the Underwriters' Fire Extinguishers and containing much useful information regarding the use of hand extinguishers as a safeguard against serious fires.

THE ARROW CAN COMPANY, 35 Warren street, New York: Illustrated circular showing its patented rod reinforced Arrow Ash and Garbage Cans and other styles,

some lower priced. There are shown the Engineers', Janitors' and Jersey Ash Cans, both painted and galvanized, and Philadelphia and Popular Garbage Cans, together with the Bosco Oil and Gasoline Can.

AMERICAN RAILWAY SUPPLY COMPANY, 24 Park place, New York: Elaborate catalogue covering an extensive line

of Stamped and Embossed Metal Work and Railway Supplies, including Baggage and Hotel Checks, Number Plates, Pay Checks, Medals, Breast and Cap Badges, Buttons, Lanterns, Stamps, Ticket Punches, &c.

STRICKLER HAY TOOL COMPANY, Janesville, Wis.: Illustrated catalogue No. 10, referring to Hay Carriers, Forks and Slings, Steel Track, Hooks, Pulleys, &c.

KEYSTONE SHOVEL WORKS, Philadelphia, Pa.: Price-list circular of Shovels, Spades, Scoops and Drainage Tools.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM COLUMBUS HARDWARE COMPANY, Columbus, Miss., successor to Pegnes-McCown Hardware Company, which has recently been organized to conduct a wholesale and retail Hardware business.

FROM PRESCOTT-WILSON COMPANY, Spencer, Mass., which has bought the Hardware, Paint and Plumbing and Heating business conducted by G. H. Marsh for over 30 years.

FROM JOHNSON & BOWLES, Yuma, Ariz., who have recently incorporated, with an authorized capital of \$25,000, of which \$15,300 has been subscribed, to carry on the Hardware, Crockery, Harness and Vehicle business.

FROM F. E. THOMPSON, 62 Columbus avenue, Haverhill, Mass., who has lately severed his connection with the Hanscom Hardware Company of that city, and intends to engage in business for himself.

The Prowell Hardware Company, Birmingham, Ala., which was recently burned out, is temporarily located at 2016 First avenue, where the company is fully able to take care of all business that may come to them. The company has three years lease yet to run on its old premises, and is about reconstructing, hoping to have everything ready for occupation again in six months.

PRESERVATION OF HICKORY TIMBER IN THE UNITED STATES.

MEMBERS of the Vehicle Woodstock Association met at the Great Northern Hotel, Chicago, Wednesday and Thursday, November 14 and 15, for the purpose of discussing means for preserving the hickory timber of the United States. A testing laboratory for the forest service is also being advocated, and a committee of three, consisting of B. F. Von Behren, Evansville, Ind., J. M. Skinner, Toledo, Ohio, and T. A. White, St. Marys, Ohio, was appointed to act with similar committees of allied organizations for the purpose of urging Congress to make an appropriation for the establishment of a wood testing laboratory. For a number of years it has been evident to those using large quantities of hickory in manufacturing vehicles and other commodities requiring hickory for their construction that the supply of this timber in the United States has decreased so rapidly and become so scarce as to cause serious alarm, especially during the past five years. The rapid advances in prices in the past five years of Rims, Gear Wood, Spokes, Shafts and Poles, Single Trees, Neck Yokes, Hammer Handles and Sucker Rods, it is asserted, are directly due to the growing scarcity of this timber, and unless immediate steps are taken to preserve the hickory forests it is estimated that within 15 years at the present rate of consumption, with no allowance for increased use, the hickory will be entirely depleted. Five years ago hickory was sold at \$40 a 1000 ft., Chicago, and the price to-day is \$70. During the 15 years preceding 1901 the average advance amounted to \$1 a year, whereas in the past five years the increase in value is already \$30 a 1000 ft. While opinions differ, it is estimated that to replenish this timber to meet the country's needs will require from 30 to 60 years, inasmuch as the present rate of consumption is 500,000,000 ft. annually.

To further promote the preservation of this timber the National Hickory Association, which was organized at Niagara Falls last July, is investigating the situation thoroughly, and is co-operating with the Forestry Department to secure full information regarding the amount of standing timber left in the United States and the best ways and means of prolonging the present supply. The consumers' organization, whose members are affiliated with this association, represent manufacturers of Carriages, Wheels, Rims, Gears, Wagons, Spokes, Shafts, Poles, Single Trees, Neck Yokes, Hammer Handles, Sucker Rods and dimension stock.

JOHN G. ROLLINS & SONS' NEW CATALOGUE.

JOHN G. ROLLINS & SONS, 15-25 Whitehall street, New York, and 124 Holborn, London, have just issued an illustrated catalogue of 316 pages, each 11½ x 8½ in., showing goods of American manufacture for export, with the name and address of each maker, their trade being principally with the United Kingdom and British colonies, particularly Australia and South Africa. Among the manufacturers for which the house is agent are Sargent & Co., Henley Lawn Mower Company, F. & N. Lawn Mower Company, Buffalo Bolt Company, Marion Handle Works, I. F. Force Handle Company, N. R. Street-er & Co., Henry Cheney Hammer Company, Vandegrift Mfg. Company, H. D. Smith & Co., R. Bliss Mfg. Company, Clauss Shear Company, Dover Mfg. Company, S. Sternau & Co. and Superior Mfg. Company. The goods of many other representative concerns exported by the house are also shown, including among others Millers Falls Company, Morse Twist Drill & Machine Company, Charles Morrill, Irwin Auger Bit Company, Barnes Tool Company, Sandusky Tool Company, Keystone Mfg. Company, Pike Mfg. Company, J. H. Williams & Co. and Union Hardware Company.

Savage & Dunton, Jackman, Maine, have been succeeded by Elmer H. Dunton, who will continue in the same line of business at the old stand.

ENTERPRISE MFG. COMPANY.

THE ENTERPRISE MFG. COMPANY, Akron, Ohio, the well-known manufacturer of Fishing Tackle, is about completing an addition to its plant which will nearly double the company's capacity. The new building is a five-story brick structure, 50 x 100 ft. in dimensions. With its completion the company will give employment to nearly 400 persons. The Enterprise Company was incorporated more than a quarter of a century ago with E. F. Pflueger at its head. Many of the company's most notable products are the result of his invention, and are protected by numerous patents owned by the corporation. Mr. Pflueger died in 1901, and was succeeded by his four sons—J. E., G. A., E. A. and C. T. Pflueger, who have since conducted the business with marked success. During the past season business with the company has been exceptionally large. More than 100,000,000 Fish Hooks were sold, a good percentage of which was sent abroad. The company states that the foreign prejudice against American Fish Hooks is rapidly diminishing, and its export trade in these and other of its products is said to be developing very satisfactorily.

THE LOCATION OF CHICOPEE FALLS.

A DESIRE to answer effectively the question frequently asked by its customers, "Where is Chicopee Falls?" and at the same time to impress upon them the advantages of its location in the heart of the "firearms district" and its exceptional shipping facilities has led the J. Stevens Arms & Tool Company to issue a small map of southern New England, taking Chicopee Falls, Mass., as a center. The map is not distorted in any way, and shows only important railroad lines, leaving out many of the branch lines and electric roads in the territory covered. It shows clearly, however, that Chicopee Falls is directly accessible to the main lines between New York and Boston, Boston and Albany and Montreal or Quebec and New York. The company extends a cordial invitation to the trade to pay it a visit and learn where and how Stevens Firearms are made.

THE CONTINENTAL COMPANY.

THE CONTINENTAL COMPANY, Penobscot Building, Detroit, Mich., is distributing catalogues representing the Screen product for 1907 of the different factories for which it acts as sole sales agent. The Continental Company handles the output of the following manufacturers: A. J. Phillips Company, Fenton, Mich.; Porter Screen Mfg. Company, Burlington, Vt.; Wabash Screen Door Company, Minneapolis, Minn., and Memphis, Tenn.; Philadelphia Screen Mfg. Company, Philadelphia, Pa.; Queen Anne Screen Company, Burlington, Vt., and Owosso Mfg. Company, Owosso, Mich. The different catalogues are attractively printed and represent the full lines of Screen Doors, Window Screens and Window Screen Frames put on the market by the different makers.

AMERICAN CUTLERY COMPANY'S FIRE.

THE plant of the American Cutlery Company, Chicago, manufacturer of Table Cutlery, was destroyed by fire on November 14, entailing a loss of \$200,000. The warehouse containing completed stock was not seriously damaged, although many of the goods were water soaked. The fire seriously inconveniences the company in providing for the holiday trade, and while plans are already being prepared for the reconstruction of the manufacturing departments, it will be some time before operations can be resumed.

THE 1907 convention of the South Dakota Retail Hardware Association will be held at Aberdeen, on January 31 and February 1 and 2. It is expected that provision will be made for exhibits by manufacturers and jobbers, but the details of this feature of the convention have not yet been perfected.

EXHIBITS AT HARDWARE CONVENTIONS.

WHAT MANUFACTURERS AND JOBBERS THINK OF THEM.

We have received a number of letters from both jobbers and manufacturers in which reference is made to the advantage or disadvantage of making formal exhibits at retail Hardware conventions. This is a practice which has shown pronounced development during the present year. As a matter of interest we give extracts from a few of many letters which have come to hand, which give a pretty good idea of the way the subject is regarded by those making exhibits.

Decidedly Advantageous.

From an Eastern Manufacturer: We have found decided advantages in exhibiting at the various conventions and the trouble and expense have been amply justified.

We have followed this more extensively during the past year than heretofore and feel that future occasions will warrant more extensive care and expenditures in this regard. We do not know of any way of reaching the trade more satisfactorily than through this medium. Coming in personal contact with the dealers as we do, we are able to impress them with our contentions and to give them a practical demonstration of materials. The radius of territory covered by such an exhibit is beyond estimation, and will cost many hundred dollars to canvass. It is not an uncommon thing to make numerous and sometimes extensive sales directly from the exhibit tables, and in every case numerous prospects are developed which afterward, through the calls of our representatives, materialize into business.

We have also found it advantageous to become members of the more important Hardware associations, and thus derive the benefits of personal acquaintance with the foremost dealers in the States. Time and space prevent us from citing numerous specific instances of very satisfactory orders resulting directly from these conventions, and in many instances we have secured some of our best local representatives through acquaintance thus made.

Abundant Space.

Relative to suggestions covering features of these conventions we can only say that in every instance abundant space should be secured for exhibits. The conventions should be held in buildings affording plenty of room, as it is necessary for the exhibits to be located at the same place where the convention is held. The more numerous and extensive the exhibits the greater advantages are to be derived by the exhibitors, because they are all more or less directly interested in the products of each other. Furthermore, the more numerous the variety the greater number of people will be attracted, and the success of the convention depends largely upon the number of the attendants.

In the Western country dealers take advantage of these conventions (and indeed it is often their only opportunity) to become acquainted with the various improved features of their business, and we feel safe in saying that a very large proportion of the attendants are interested more in the exhibits than they are in the proceedings of the convention.

The Greatest Disadvantage

under which exhibitors labor at such conventions is the presence of innumerable children who have no business in the building, but are simply souvenir hunting and congest the passage ways, making it sometimes almost impossible, for those who really have business there and are interested to get around. Our suggestion would be that proper precautions be taken to eliminate this objectionable feature.

Another objectionable feature is the frequent crowding of exhibitors. As a rule, they prefer to spend more money for space and have room than to be unduly crowded together. We believe that the associations could give more satisfactory service and derive as much profit from the spaces if they were made larger. Furthermore, we think it advisable to prevent exhibitors as far as possible from subletting a portion of their space.

Immediate Results Small but Eventually Lead to Increased Business.

From a Prominent Jobbing House: The immediate or direct returns from displays made by manufacturers and jobbers at the meetings of the retail Hardware associations are of small consequence and hardly justify the expense. This, however, is one way of advertising, and gives both the jobber and manufacturer an opportunity to show up new goods.

The retail dealers through this medium of advertising no doubt learn something as to how to talk and sell their own wares, as well as the new goods. As a usual thing merchants do not attend these meetings for the purpose of buying, but in all probability a great many of them go home with impressions that eventually result in an increased business from them for the jobbers and manufacturers making the exhibits.

Many Benefits Derived.

From a Michigan Manufacturer: We consider the retail Hardware association conventions of great benefit to us. The benefits derived are numerous.

We meet the trade socially. We meet them when they are out looking for all the good points they can secure which will benefit them in business. At the conventions the merchant is receptive, while in his own store, surrounded by the daily routine of business and the various and constant demands upon his attention, his time is often more valuable in the pursuit of getting money in than in considering some means of getting money out.

Opportunity for Consultation.

If at the convention he is favorably impressed with any certain product it is not necessary for him to rely only upon his own opinion regarding it, but he can also secure the opinion of his brother merchants, and can even consult some who have already had experience with those goods in which he happens to be interested.

At the conventions the manufacturers who are in close touch with production can meet and consult with the retail merchants who are in close touch with consumption and ideas of mutual benefit invariably result from the consultation of these two extremes.

Disagreeable Features.

In speaking of these conventions we think it only fair to mention the disagreeable features as well as their benefits. We have exhibited at a number of these conventions and in every instance the exhibits were made in a large hall. This gave the exhibitors an exceptional opportunity to display their product to all of the merchants, but unfortunately, owing to the crowds of souvenir hunters often seen circulating among the booths with baskets on their arms which they were filling with souvenirs, the merchant could not receive from the manufacturer the attention which he deserved and which the manufacturer had gone to such pains and expense to show him.

If by some means of strict and judicious doorkeeping this horde of uninterested parties entirely outside of the trade could be kept out of the exhibit halls we believe that the custom of exhibiting at the Hardware conventions on a large scale could be made both profitable and beneficial to both the merchants and the exhibitors.

Manufacturers and Jobbers Should Not Exhibit Outside Their Own State.

From an Illinois Manufacturer: I believe the display of goods by manufacturers and jobbers at the State conventions is something that should be done, but believe it should be confined to the manufacturer and jobber of the State in which it is held.

I do not think it advisable to go from State to State because in a short time it would become a very heavy expense and I think in a great many instances would retard instead of interest the dealers.

We should not attempt to display our goods at the State conventions outside of our own State. Personally I think there should be a mutual understanding by all manufacturers that the State convention belongs to those that are within its borders.

Does Not Pay.

From a Well Known Jobbing House: Frankly the writer does not think that on a general basis it pays by any means to make exhibits at retail Hardware conventions. Merchants do not generally attend those conventions for buying goods. You hear of an occasional manufacturer that has a display of some special goods taking quite a lot of business at one of those conventions, but, on the other hand, the merchants don't want to be bothered and don't want to be pushed for business. They go to these conventions to learn about how their neighbors are doing business, and at the same time to have a little vacation and a good time.

The Souvenir Craze.

The greatest interest most of the dealers have in exhibits is the souvenirs that are being given away. They all seem to be crazy to get souvenirs, no matter what the value of the article is. The exhibits, on the other hand, make quite a drawing card, because they bring to headquarters a large number of manufacturers and jobbers and give all the retail dealers a chance to become personally acquainted with the jobbing and manufacturing trade, because the jobbers and manufacturers at these conventions always make a special effort to treat the customers with every consideration possible.

Disadvantageous to the Jobber.

On the other hand, there is no question but that exhibits of special lines of goods by manufacturers are a great detriment to the Hardware jobber. While there are a lot of retail dealers that buy this short line or that short line direct from some manufacturer who sells his goods through the retail trade, yet there are a lot of retail dealers that have not been in the habit of doing so to any great extent. When they go to those conventions and meet other retail dealers that have been doing it and hear them tell of this advantage and that advantage it does influence many retail dealers to start in buying from the manufacturer that would not otherwise think of it.

The idea of renting a hall and having all the exhibits in one room is a most excellent idea, as in that way it is possible to keep out people not interested in the trade—in other words, to allow Hardware dealers only admittance. Where headquarters are held in a hotel and all the displays are in the hotel outsiders are able to go there at any time, with a result that they are a great annoyance, especially to people that give their customers souvenirs.

Personal Inspection and Discussion.

From a Minnesota Manufacturer: The retail Hardware conventions present an opportunity of reaching more actual buyers in the shortest time and with less expense than in any other way. It permits of a large display of goods which the dealers can personally inspect and discuss with the manufacturers. A dealer can see a greater variety of lines and acquire more real information in a few days than he could in six months of desultory visits from traveling men.

There is no question but what the trade fully appreciate this feature of the conventions.

But like any other form of advertising which is correct in principle, much depends upon the methods adopted, and

These Have Been Faulty

in many respects. So far as we are concerned, we believe that our convention exhibits have been profitable enough to warrant their continuance. The orders we book would alone compensate for the expense.

We are not alone, however, in the opinion that the management of these exhibits is susceptible of improvement. The exhibits are seldom adequately provided for. They are either crowded together in the corridor of a hotel, scattered throughout the building or divided between several places. It would be a whole lot more satisfactory and profitable to all concerned if the association would

Hire a Hall or Building.

have it decently and orderly arranged and rent the space to the exhibitors. It would be better yet if the exhibits could be ranged around the hall actually used as a meeting place. This would save lots of time and obviate the intolerable nuisance of souvenir hunters.

The practice of giving expensive souvenirs is one that might be discontinued without detriment to either side, and it would have the effect of encouraging the manufacturers to put more money into features that would be really worth while.

Programme Advertising Should Be Dropped.

In States where it has been tried, the associations have found that they could derive enough revenue from the rental of exhibition space to enable them to drop the solicitation of contributions under the guise of programme "advertising." This puts the finances of the associations upon a much more substantial and dignified basis. They can feel that they are not dependent in any way upon charity for support, but that they have given value received for all they get.

THE WIMBERLY & THOMAS HARDWARE COMPANY, Birmingham, Ala., which has conducted a wholesale and retail trade for 14 years at 2013 First avenue, is about dividing the departments by continuing the retail trade in the old premises and erecting a new building on Avenue A, between Eighteenth and Nineteenth streets, for the wholesale department. The building will be four stories, 250 ft. front and 140 ft. deep. Connection will be made with all the railroads entering the city by the Belt Line. It is expected the building will be ready for occupancy on June 1 next. The company has lately increased its capital stock from \$150,000 to \$200,000.

GEORGIA PLOW WORKS, formerly Atlanta Plow Works, Atlanta, Ga., is presenting to the trade its initial catalogue. In so doing the company announces that it has equipped its plant with the best modern labor saving machinery for the economical manufacture of Finished Steel Plow Shapes. While its oak timber is seasoning the company will confine its output exclusively to this line, which it will make from carefully selected patterns adapted to the soils of the South and West.

THE FIRMS of John A. Thomson & Co. and F. W. Cheney & Son, Lowell, Mass., have consolidated and formed a stock company under the laws of Massachusetts, with a capital of \$10,000. The name of the new corporation is the Cheney & Thomson Company. A full line of Builders' Hardware, Mill Supplies, Paints, Oils, Glass, Seeds and lawn requisites is carried. Frank W. Cheney and John A. Thomson are old partners in the Hardware line, having been associated together from 1889 to 1900 under the firm name of F. W. Cheney & Co.

In a severe fire which recently destroyed the town of Oro Fino, Idaho, the Hardware store and stock of L. Stannus was burned. Mr. Stannus announces that he will rebuild with brick as soon as material can be obtained.

System for the Retailer.

Third Article.

CHECKING INVOICES.

BY JOHN A. MANSON, BURLINGTON, VT.

A COPY of every order placed should be kept and as far as possible time of shipment, terms and dating noted. Twice a week a review should be made of all outstanding orders, and shipments hurried accordingly.

An experienced clerk should have charge of checking and the pricing at retail of all invoices so that no goods become placed before pricing. He should note on each invoice from freight and cartage record the date when goods were received, the weight of the shipment and the amount of freight. Retail prices only should be marked on packages, sample boxes and price cards. Fig. 2 shows the invoice after the performance of this work, an upward stroke being added to the check line against each item and further details being filled out in the blank in

AGENTS FOR P. & F. CORBIN, BUILDERS' HARDWARE. JEWELL BELTING CO., LEATHER BELTING. J. C. PEARSON CO., COATED NAILS. UNION METAL CORNER CO. UNION CORNER BEAD.		JOHN A. MANSON & CO. WHOLESALE AND RETAIL HARDWARE MILL SUPPLIES, PAINTS. ROOFINGS, FENCINGS AND SPORTING GOODS. BURLINGTON, VT.		AGENTS FOR PATTERSON-SARGENT CO., R. P. S. PAINTS. J. A. & W. BIRD & CO., FLINTKOTE ROOFING. SAMUEL CAROT, SHEATHING QUILT. PITTSBURGH STEEL CO., PITTSBURGH. PERFECT FENCING.	
TERMS 60 days 2% 10 days SOLD TO <i>Jas. Monroe & Co.</i> LEDGER PAGE <i>370</i> <i>Richmond, N.Y.</i>					
	✓	5 dz 6 in B. A. Mill Files	³⁵⁰ 17.50		
	✓	15 " 8 " "	⁴³⁰ 64.50		
			82.00		
		Less 70 + 10%		22.14	
	✓	20 gro 3/4 x 7 F.H. Bolt Screws	⁹⁰ 18.00		
	✓	20 " 1 x 8 " "	¹⁰⁵ 21.00		
	✓	30 " 1 1/4 x 10 " "	¹³² 39.00		
	✓	20 " 1 1/4 x 11 " "	¹⁴⁰ 28.00		
			106.00		
		Less 87 1/2 + 10%		11.93	
	✓	6 11 in Monitor Lawn Mowers	²²⁵ 13.50		
	✓	4 - 18 " " "	²⁵⁰ 10.00		57.57
Invoice Rec'd & Credited <i>Mar 27</i>					
Terms <i>60-2% 10</i> Pay <i>Apr 4</i>					
Goods Rec'd <i>Wt.</i> <i>Lbs.</i> <i>Frt.</i> <i>\$</i>					
Checked & Priced					
Figured & Verified					

Fig. 1.—Invoice After It Has Been Credited and Compared with Original Order.

When invoices are received they should be credited and checked from original orders and advices promptly given regarding any back orders. An invoice which has been handled in this way is reproduced in Fig. 1. The single line check at the left of each item indicates that the in-

the lower left hand corner, including the initials, "P. S. D.," of the man who checked and priced the goods. At this stage invoices go into another file or pigeon hole marked, "Invoices of Goods in Store."

Before the invoice is paid all prices, lists and freight

	✓	5 dz 6 in B. A. M			
	✓	15 " 8 " "			
		Less 70			
	✓	20 gro 3/4 x 7 F.H. Bolt			
	✓	20 " 1 x 8 " "			
	✓	30 " 1 1/4 x 10 " "			
	✓	20 " 1 1/4 x 11 " "			
		Less 87 1/2			
	✓	6 11 in Monitor Lawn			
	✓	4 - 18 " " "			
Invoice Rec'd & Credited <i>Mar 27</i>					
Terms <i>60-2% 10</i> Pay <i>Apr 4</i>					
Goods Rec'd <i>Wt.</i> <i>5.20</i> <i>Lbs.</i> <i>Frt.</i> <i>\$ 1.65</i>					
Checked & Priced <i>P.S.D.</i>					
Figured & Verified					

Fig. 2.—Invoice After Checking and Pricing the Goods.

voice agrees with the original order. Other entries will be noted, filling out some of the blanks of the rubber stamp in the lower left hand corner. After this work has been done invoices should be carried in a file or pigeon hole marked, "Invoices of Goods in Transit."

	4	5 dz 6 in B. A.			
	4	15 " 8 " "			
		Less 70			
	4	20 gro 3/4 x 7 F.H. Bolt			
	4	20 " 1 x 8 " "			
	4	30 " 1 1/4 x 10 " "			
	4	20 " 1 1/4 x 11 " "			
		Less 87 1/2 +			
	4	6 11 in Monitor La			
	4	4 - 18 " " "			
Invoice Rec'd & Credited <i>Mar 27</i>					
Terms <i>60 2% 10</i> Pay <i>Apr 4</i>					
Goods Rec'd <i>Wt.</i> <i>5.20</i> <i>Lbs.</i> <i>Frt.</i> <i>\$ 1.65</i>					
Checked & Priced <i>P.S.D.</i>					
Figured & Verified <i>F. M. R.</i>					

Fig. 3.—Invoice Figured and Verified and Checked in Full.

charges should be verified and the extensions carefully figured. A convenient price book—one that can be handled easily at telephone—should be used and should contain all names, numbers and sizes of goods carried, standard lists, discounts, net costs, names of concerns from

whom goods are purchased, dates of last purchases, freight allowances and wholesale and retail prices. After this verification is completed the invoice appears as in

company are Julius F. Kenkel, president; Geo. Falkenheimer, vice-president, and August H. Falkenheimer, secretary and treasurer. August H. Falkenheimer was for-

4	5 dg 6 in B. A. Mill Files	350	17.50		
4	15 " 8 "	100	64.50		
			82.00		
			Less 70 x 10%	22.14	
4	20 gro 3/4 x 7 FH Bt Screws	90	18.00		
4	20 " 1 x 8 "	100	21.00		
4	30 " 1 1/4 x 10 "	130	39.00		
4	20 " 1 1/4 x 11 "	140	28.00		
			106.00		
			Less 87 1/2 x 10%	11.93	
4	6 - 16 in Monitor Lawn Mowers	225	13.50		
4	4 - 18 "	250	10.00		
			Less 2%	57.57	
Invoice Rec'd & Credited Mar. 26					
Terms 60-2% 10 Pay Apr. 4					
Goods Rec'd 3/4 Wt 5.20 lbs. Fri. 3/26/06					
Checked & Priced P. O. B.					
Figured & Verified F. M. P.					

Fig. 4.—Invoice Paid and Ready for Filing.

Fig. 3, a third line having been added to the check and the initials of the accountant, "F. M. P.," signed in the lower left hand corner. The file or pigeon hole containing the invoice should now be marked "Invoices Checked and Priced."

The invoice then goes to the bookkeeper for payment, after which it is stamped with date as at the lower right hand corner in Fig. 4. It is then ready for final filing.

(To be continued.)

AMONG THE HARDWARE TRADE.

Collin Rush has sold his Hardware store at West Washington, Pa., to C. T. Irwin, who has removed the stock to the Irwin Block and has opened a general Hardware store.

The Erie Hardware Company, Erie, Pa., will soon open a branch store in the new building that is being erected for it on Eighth street, near Chestnut.

Belt Hardware Company has bought the business of P. J. O'Hara, Geyser, Mont.

Beyrer & Sand, Bertrand, Neb., have succeeded Beyrer, Dressler & Tozer.

Hansen & Hempling have bought the business formerly owned by Bennett Hardware Company, Bennett, Iowa.

Weddington Hardware Company, Charlotte, N. C., has been incorporated with an authorized capital of \$150,000, of which \$50,000 has been paid in, to conduct a retail and wholesale Hardware business.

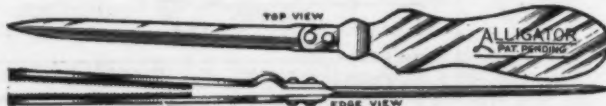
McDowell & Phillips, Montesano, Wash., have been succeeded in the Hardware business by Phillips Bros. T. J. McDowell is removing to South Tacoma, where he will engage in the same line of trade.

The Falkenheimer-Kenkel Hardware Company has been organized at Milwaukee, Wis., with a capital stock

merly the credit man and cashier of the Luthe Hardware Company, Des Moines, Iowa.

Alligator Check Protector and Letter Opener

S. I. Atwater, 369 Broadway, New York, is marketing the Alligator check protector and letter opener, patent pending, two views of which are here shown. It is designed for individual sale or as an advertising novelty, for distribution gratuitously, in the latter instance a business card, an address, fac-simile handwriting trademark.



Alligator Check Protector and Envelope Opener.

specially designed handles, &c., being furnished in quantities at an agreed price, its value as such being increased by being continually on view and in use. It is 7 3/4 in. long over all, made of highly polished and nicked steel and cuts or perforates a rectangular space over check figures 7-16 x 2 in., thus complying with the law requiring makers of checks to take reasonable precautions against their being raised, a smart blow on the upper handle being all that is necessary. Each protector is neatly packed in a double pasteboard box suitable for mailing.

Gay's Combination Screw Driver No. 1

The combination ratchet, spiral and rigid screw driver and drill illustrated herewith is made by Geo. E. Gay, Augusta, Maine. The length of the tool without bit when closed is 11 1/2 in.; when extended 16 1/2 in. In use the slotted ring is turned toward the right to ratchet or push a screw in; conversely, the ring is turned to the left in taking out a screw. To make the spindle rigid the



Gay's Combination Screw Driver No. 1.

of \$10,000, by Julius F. Kenkel, August H. Falkenheimer and Geo. Falkenheimer. The company has purchased the business formerly conducted by Julius Seyfert at 916 Third street, and has commenced business at the same location with a full new stock of Hardware, including a complete line of Stoves and Furnaces. The officers of the

slotted ring is turned so that the pin will be in the middle of the slot. The tool combines in one a right and left hand ratchet screw driver, a right and left hand spiral screw driver, a rigid screw driver and a spiral push drill. The outfit includes three screw driver bits, a drill chuck with eight drills to fit the tool, also a countersink.

Electrotype Case.

W. C. Heller & Co., Montpelier, Ohio, are offering a line of electrotype cases, one of which, the No. 2 size, is shown in the accompanying cut. The cases have an outside exposure of oak, antique finish, and contain dust-proof drawers of galvanized steel, fitted with copper pulls and card frames. They have steel backs and are



Electrotype Case No. 2.

declared to be dust and damp proof. The No. 1 is 25½ in. wide, 15 in. high and 16 in. deep, and contains 21 drawers; No. 2 is 25½ x 29 x 16 in., containing 42 drawers; No. 3 is 50¼ x 29 x 16 in., containing 84 drawers. The cases are made without projecting molding, so that they can be set close alongside of one another. The makers express the opinion that many firms have cuts or electros knocking around their establishment which usually cannot be found when wanted and are very liable to loss or damage. With a cabinet of this kind they can be kept where they will occupy the minimum amount of room and be protected from damage and immediately accessible when wanted.

Mission Design Chafing Dish.

Manning, Bowman & Co., Meriden, Conn., and 25 West Broadway, New York, who manufacture a large assortment of chafing dishes and related table ware, have brought out for the holiday trade the Mission design



Mission Design Chafing Dish.

chafing dish No. 298, here illustrated. It is mounted on a solid three-piece quartered oak base, Mission finish, 8 x 8 x 17-16 in., the grain of the wood running different ways to counteract any tendency to warp. The ring supporting the pans is upheld by four three-sided rectangular legs secured to the base by screws from underneath, made flush by counterboring. The chafing dish is 9½ in. in diameter and has a capacity of three pints.

The alcohol fuel is burned in the company's Perfection lamp, having two horizontal slide covers operated by the square tapered wood handle. The cover knob, side and pan handles are also square and ebonized. The metallic portions of the utensil are principally copper, plain or plated finishes, there being one design brass trimmed for contrast. The interiors of water and food pans and cover are usually in silver, French finish, a food pan in ivory enamel inside and outside being furnished if so ordered without extra expense. These chafing dishes can be supplied regularly in brass, copper, nickel plate and silver plate. This same design is also made supported by three instead of four legs, without hardwood base.

The Cronk Garden Mattock.

The Cronk & Carrier Mfg. Company, Elmira, N. Y., is offering the garden mattock illustrated herewith. This new pattern blade is made in a single piece in place of two separate blades riveted to the eye, as in the old



The Cronk Garden Mattock.

style mattock made by the company. The one illustrated is made in two sizes: No. 13, with 3 x 1¼ in. blades, and No. 14, with 3½ x 1¼ in. blades. The size of the handle has also been increased over that of the old style tool. The two sizes weigh from 30 to 33 lb. per dozen.

Popular Corrugated Pail.

The Arrow Can Company, 35 Warren street, New York, which is building up a business in high grade ash and garbage cans, has just added to the line the Popular corrugated pail for garbage, ashes and general use. It is numbered 53, is 13 x 13 in. in dimensions, has a capacity of 7 gal. and weighs 14 lb. It is made of black sheet



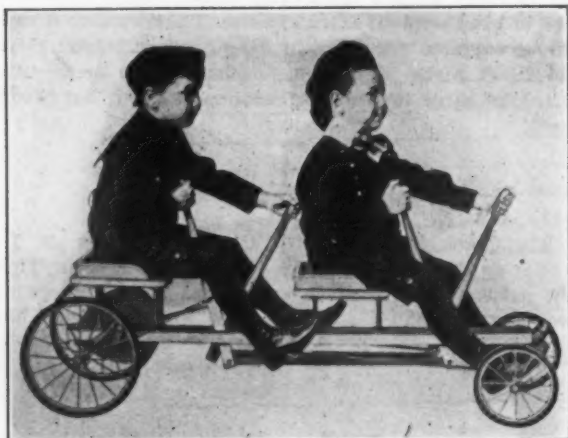
Popular Corrugated Pail.

plate, with heavy outer and inner bands, top and bottom securely riveted to the cylindrical body, all the material being heavy stock. The bale handle, side clips and cover handle are also of substantial material and riveted, the cover fitting snugly on and outside the body. A special feature of the body is the six groups of triple corrugations for stiffening the pail, which is galvanized after manufacture and then soldered liquid tight at bottom.

The Griffin Hardware Company, Rome, Ga., has added another story to its building, to be used as stock and show room for buggies.

Glascoek Tandem Racer, No. 2.

The tandem racer, No. 2, here shown, is an addition to the line of children's hand cars made by Glascock Bros. Mfg. Company, Muncie, Ind. In construction it is said to represent quite an improvement over the wagons first gotten out, running much easier, so that one rider can

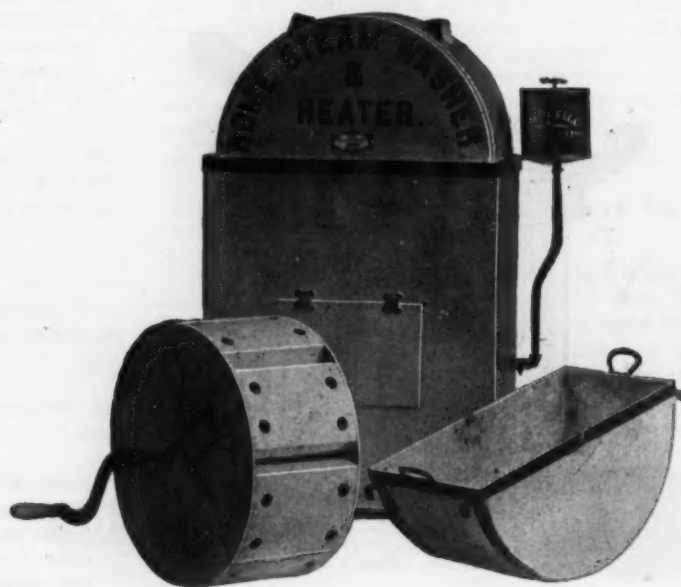
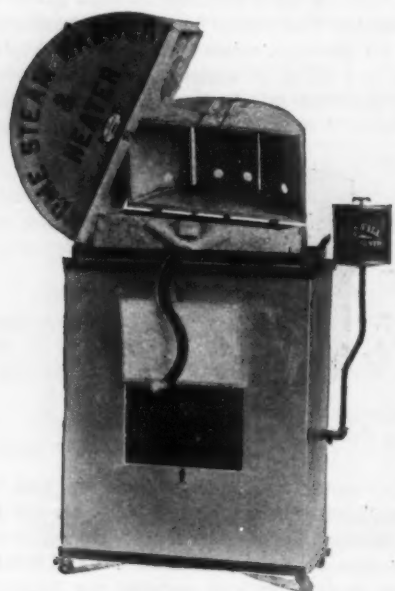


Glascoek Tandem Racer No. 2.

operate it almost as easily as the single machine. It is strongly built, having extra heavy rear wheels 12 in. in diameter. The front wheels are 8 in. in diameter, and all are tinned and rubber tired. The wagon is handsomely finished in blue and willow yellow, with the metal parts enameled and baked the same as bicycles. The company's line now consists of the No. 1 racer for children from 6 to 15 years of age; the No. 4, for little ones from two to six years old; the No. 3 for girls, and the No. 2 here described.

Home Steam Washer and Heater.

Home Metallic Refrigerator Company, Albert Lea, Minn., makes the washing machine illustrated in the accompanying cuts. It is constructed of high-grade galvanized steel and contains no wood which might swell, warp or shrink, or absorb or exude any extraneous matter. It



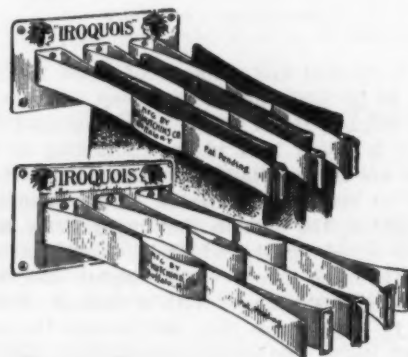
Home Steam Washer and Heater.

has ball bearing castors and consists of a heater, heating plate, boiler, cylinder and top cover, so formed that each fits into the other, making a compact whole. There is an asbestos lining throughout, and it is furnished with gas or gasoline burners complete, having a door in front

allowing free access to the burners. The boiler has a round bottom, requiring less water than a flat bottom and effecting a considerable saving in fuel. The cylinder into which the clothes are placed revolves inside the boiler, being turned by a crank which is riveted to the side of the cylinder and has its bearings on the boiler. A hinged top with strong fastener keeps the clothes within the cylinder when it is revolving. The pockets or cross pieces carry the clothes upward and allow them to fall back rapidly, forcing the steam and water through the folds of the fabric and loosening the dirt. The top cover fits over all the other parts, confining the heat and steam, so that there is no waste in the use of fuel. It can also be used as a tub for clothes when they are taken from the cylinder. The washer is made in three sizes: No. 10, with 10-in. cylinder; No. 12, with 12-in. cylinder, and No. 14, with 14-in. cylinder.

Iroquois Trousers Hanger.

C. K. Hutchins Company, Buffalo, N. Y., is just bringing out the patented trousers hanger here illustrated. It is attractive in appearance, being nickel plated inside and



Iroquois Trousers Hanger.

out, and occupies very little room when screwed to the wall or to the inside of a closet door. It will be observed that the arms are riveted to the base plate and are so shaped as to form a spring, which can be locked together

by the ring on the end when trousers are in place. There is a swell in the arms near the middle to accommodate the seam of the trousers. In view of this and the width of the smooth flat sides it is urged in favor of this hanger that it will leave no mark upon the cloth.

Buffalo Compressed Air Forge No. 21-C.

The accompanying cut represents a forge operated by compressed air, designed for indoor use, which may readily be taken apart and reassembled if it is desired to ship it any distance. The weight of the forge allows it to be easily handled by one man and carried to any part of the shop. The forge is for use in rivet heating in



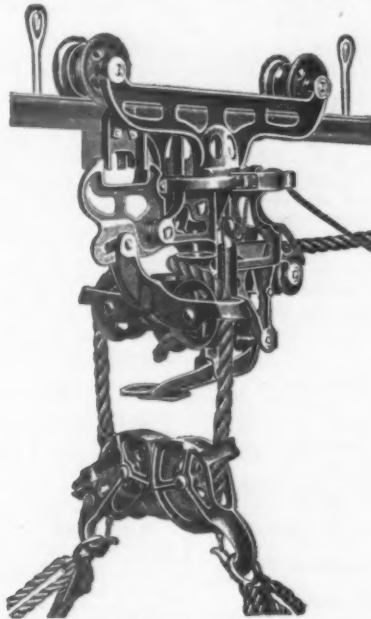
Buffalo Compressed Air Forge No. 21-C.

structural steel work, boiler shops or railroad shops where compressed air is available. The forge is entirely automatic and obviates the necessity of riveters waiting for rivets while some one turns the crank. Enough rivets can be supplied to keep two or three gangs of riveters at work. The mechanism for supplying the air to the fire consists of the fan wheel, which is safely inclosed within the cast iron fan casing, so it cannot become injured. A small jet of compressed air impinges on the fan blades, causing them to revolve and draw in 40 times the volume of compressed air used through the inlet to the fan casing, forcing it all through the clinker breaking ball tuyere, which is furnished with the forge. The forge is put on the market by Buffalo Forge Company, Buffalo, N. Y. The company also makes another style of the same forge, No. 20-C, for outdoor use, which is of barrel construction, made of sheet steel with a dash to protect the fire from wind. This forge has a bowl 6 in. deep and 18

in. in diameter. The ample firepan adapts the forge not only to rivet heating, but also to work of a much heavier nature, such as general repair work, and it will produce a welding heat on a 4-in. iron in less than 10 min.

Sling Carrier with Parallel Pulleys.

Hunt, Helm, Ferris & Co., Harvard, Ill., are offering a new sling carrier, shown herewith, which is so constructed that parallel pulleys may be used in taking up hay at the end of a barn and still avoid the twisting of the rope. This feature, it is claimed, is an improvement in hay carrier construction, as the parallel pulleys are



Sling Carrier with Parallel Pulleys.

much easier to use than right angle pulleys, also permitting the hay to be taken up at the center of the barn if desired. The claim is further made that this carrier simplifies the sling carrier proposition for the retail merchant, as it is not necessary for him to carry in stock carriers with more than one style of pulley, making it an easy article to sell the farmer for the reason that but one set of pulleys is required whether the hay is taken in at the end or center of the barn.

PAINTS, OILS AND COLORS**Animal, Fish and Vegetable Oils—**

Animal, Fish and Vegetable Oils—	gal
Linseed, City, raw.....	42 @43
City, Boiled.....	43 @44
State and Western, raw.....	41 @42
Raw Calcutta, in bbls.....	40 @41
Lard, Extra Prime, Winter.....	76 @77
Extra No. 1.....	51 @52
Cotton-seed Crude, f.o.b. mills.....	45 @49
Summer Yellow, Prime.....	49 @50
Summer Yellow, off grades.....	52 @53
Sperm, Crude.....	52 @53
Natural Spring.....	52 @53
Bleached Spring.....	52 @53
Natural Winter.....	52 @53
Bleached Winter.....	52 @53
Bleached Winter, Extra.....	70 @72
Tallow, Prime.....	56 @57
Whale, Crude.....	35 @36
Natural Winter.....	45 @46
Bleached Winter.....	47 @48
Extra Bleached Winter.....	49 @50
Menhaden, Brown, Strained.....	30 @31
Light Strained.....	30 @31
Bleached, Winter.....	30 @31
Extra Bleached, Winter.....	30 @31
Southern.....	25 @26
Cocunut, Ceylon.....	10 @11
Cochin.....	9 @10
Cod, Domestic, Prime.....	30 @31
Newfoundland.....	28 @29
Red, Elaine.....	48 @51
Saponified.....	10 @11
Olive, Italian, bbls.....	60 @70
Neatsfoot, Prime.....	49 @50
Palm, Logos.....	74 @75

Mineral Oils—

Mineral Oils—	gal
Black, 29 gravity, 250 cold test.....	10 @11 1/2
29 gravity, 15 cold test.....	11 1/2 @12 1/2
Summer.....	10 @11 1/2
Cylinder, light filtered.....	18 @19
Dark filtered.....	16 @17
Paraffine, 903-907 gravity.....	13 @14
903 gravity.....	12 1/2 @13
883 gravity.....	10 1/2 @10 3/4
Red.....	12 1/2 @14

Miscellaneous—

Miscellaneous—	
Barytes:	
White, Foreign.....	1 ton \$18.50 @20.00
Amer. floated.....	1 ton 19.00 @
Off color.....	1 ton 11.50 @15.50
Chalk, in bulk.....	1 ton 3.00 @ 3.25
In bbls.....	100 lb 3.00 @ 3.25
China Clay, English.....	1 ton 11.00 @17.00
Cobalt, Oxide.....	100 lb 2.50 @ 2.60
Whiting, Commercial.....	100 lb 43 @ 48
Gilders.....	100 lb 50 @ 55
Ex. Gilders.....	100 lb 55 @ 60

Putty, Commercial—

Putty, Commercial—	100 lb
In bladders.....	\$1.70 @1.85
In bbls. or tubs.....	1.20 @1.40
In 1 lb to 5 lb cans.....	2.65 @2.95
In 1 1/2 to 5 lb cans.....	1.50 @1.90

Spirits Turpentine—

Spirits Turpentine—	gal
In Oil bbls.....	70 @71
In machine bbls.....	70 @71 1/2

Glue—

Glue—	lb
Cabinet.....	11 @15
Common Bone.....	7 @9
Extra White.....	13 @24
Foot Stock, White.....	11 @14
Foot Stock, Brown.....	8 @11
German Hide.....	12 @18
French.....	10 @18
Irish.....	13 @16
Low Grade.....	9 @12
Medium White.....	14 @17

Gum Shellac—

Gum Shellac—	
Bleached Commercial.....	47 @48
Bones, Dried.....	37 @46
Button.....	40 @50
Diamond L.....	53 @55
Fine Orange.....	50 @52
A. C. Garnet.....	45 @49
Kala Button.....	37 @38
G. A. L. Garnet.....	45 @45 1/2
D. C.....	56 @58
Octagon B.....	64 @64
T. N. Grade.....	48 @49
V. S. O.....	49 @55

Colors in Oil—

Colors in Oil—	lb
Black, Lampblack.....	12 @14
Rhine, Chinese.....	36 @36
Blue, Prussian.....	32 @36

White Lead, Zinc, &c.—	lb
Blue, Ultramarine.....	13 @16
Brown, Vandyke.....	11 @14
Green, Chrome.....	12 @16
Green, Paris.....	12 @24
Sienna, Raw.....	12 @15
Sienna, Burnt.....	12 @15
Umber, Raw.....	11 @14
Umber, Burnt.....	11 @14

White Lead, Zinc, &c.—

White Lead, Zinc, &c.—	lb
Lead, English white, in Oil.....	9 1/2 @10
Lead, American white, in Oil.....	9 1/2 @10
Lots of 500 lb or over.....	7 1/2 @7 1/2
Lots less than 500 lb.....	8 @8
In Barrels.....	6 1/2 @6 1/2
Lead, White, in oil, 25 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 12 1/2 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 1 to 5 lb.....	14 @14
as'ted tins, add to keg price.....	1 1/2 @1 1/2
Lead, American, Terms: For lots 12 tons and over 1/4 rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.....	6 1/2 @6 1/2
Lead, White, Dry, in bbls.....	6 1/2 @6 1/2
Zinc, American, dry.....	5 1/2 @5 1/2
Zinc, French.....	5 1/2 @5 1/2
Antwerp, Red Seal, dry.....	8 1/2 @8 1/2
Antwerp, Green Seal, dry.....	10 1/2 @10 1/2
Paris, Red Seal, dry.....	9 1/2 @9 1/2
Paris, Green Seal, dry.....	11 @11
Zinc, V. M. French, in Poppy Oil.....	11 @11
Green Seal.....	11 @11
Lots of 1 ton and over.....	13 1/2 @13 1/2
Lots of less than 1 ton.....	13 1/2 @13 1/2
Zinc, V. M. French, in Poppy Oil.....	13 1/2 @13 1/2
Red Seal.....	13 1/2 @13 1/2
Lots of 1 ton and over.....	11 1/2 @12 1/2
Lots of less than 1 ton.....	12 1/2 @12 1/2
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1 1/2; 25 bbls., 2%; 50 bbls., 4%.....	12 1/2 @12 1/2

White Lead, Zinc, &c.—

White Lead, Zinc, &c.—	lb
Lead, English white, in Oil.....	9 1/2 @10
Lead, American white, in Oil.....	9 1/2 @10
Lots of 500 lb or over.....	7 1/2 @7 1/2
Lots less than 500 lb.....	8 @8
In Barrels.....	6 1/2 @6 1/2
Lead, White, in oil, 25 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 12 1/2 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 1 to 5 lb.....	14 @14
as'ted tins, add to keg price.....	1 1/2 @1 1/2
Lead, American, Terms: For lots 12 tons and over 1/4 rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.....	6 1/2 @6 1/2
Lead, White, Dry, in bbls.....	6 1/2 @6 1/2
Zinc, American, dry.....	5 1/2 @5 1/2
Zinc, French.....	5 1/2 @5 1/2
Antwerp, Red Seal, dry.....	8 1/2 @8 1/2
Antwerp, Green Seal, dry.....	10 1/2 @10 1/2
Paris, Red Seal, dry.....	9 1/2 @9 1/2
Paris, Green Seal, dry.....	11 @11
Zinc, V. M. French, in Poppy Oil.....	11 @11
Green Seal.....	11 @11
Lots of 1 ton and over.....	13 1/2 @13 1/2
Lots of less than 1 ton.....	13 1/2 @13 1/2
Zinc, V. M. French, in Poppy Oil.....	13 1/2 @13 1/2
Red Seal.....	13 1/2 @13 1/2
Lots of 1 ton and over.....	11 1/2 @12 1/2
Lots of less than 1 ton.....	12 1/2 @12 1/2
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1 1/2; 25 bbls., 2%; 50 bbls., 4%.....	12 1/2 @12 1/2

White Lead, Zinc, &c.—

White Lead, Zinc, &c.—	lb
Lead, English white, in Oil.....	9 1/2 @10
Lead, American white, in Oil.....	9 1/2 @10
Lots of 500 lb or over.....	7 1/2 @7 1/2
Lots less than 500 lb.....	8 @8
In Barrels.....	6 1/2 @6 1/2
Lead, White, in oil, 25 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 12 1/2 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 1 to 5 lb.....	14 @14
as'ted tins, add to keg price.....	1 1/2 @1 1/2
Lead, American, Terms: For lots 12 tons and over 1/4 rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.....	6 1/2 @6 1/2
Lead, White, Dry, in bbls.....	6 1/2 @6 1/2
Zinc, American, dry.....	5 1/2 @5 1/2
Zinc, French.....	5 1/2 @5 1/2
Antwerp, Red Seal, dry.....	8 1/2 @8 1/2
Antwerp, Green Seal, dry.....	10 1/2 @10 1/2
Paris, Red Seal, dry.....	9 1/2 @9 1/2
Paris, Green Seal, dry.....	11 @11
Zinc, V. M. French, in Poppy Oil.....	11 @11
Green Seal.....	11 @11
Lots of 1 ton and over.....	13 1/2 @13 1/2
Lots of less than 1 ton.....	13 1/2 @13 1/2
Zinc, V. M. French, in Poppy Oil.....	13 1/2 @13 1/2
Red Seal.....	13 1/2 @13 1/2
Lots of 1 ton and over.....	11 1/2 @12 1/2
Lots of less than 1 ton.....	12 1/2 @12 1/2
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1 1/2; 25 bbls., 2%; 50 bbls., 4%.....	12 1/2 @12 1/2

White Lead, Zinc, &c.—

White Lead, Zinc, &c.—	lb
Lead, English white, in Oil.....	9 1/2 @10
Lead, American white, in Oil.....	9 1/2 @10
Lots of 500 lb or over.....	7 1/2 @7 1/2
Lots less than 500 lb.....	8 @8
In Barrels.....	6 1/2 @6 1/2
Lead, White, in oil, 25 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 12 1/2 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 1 to 5 lb.....	14 @14
as'ted tins, add to keg price.....	1 1/2 @1 1/2
Lead, American, Terms: For lots 12 tons and over 1/4 rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.....	6 1/2 @6 1/2
Lead, White, Dry, in bbls.....	6 1/2 @6 1/2
Zinc, American, dry.....	5 1/2 @5 1/2
Zinc, French.....	5 1/2 @5 1/2
Antwerp, Red Seal, dry.....	8 1/2 @8 1/2
Antwerp, Green Seal, dry.....	10 1/2 @10 1/2
Paris, Red Seal, dry.....	9 1/2 @9 1/2
Paris, Green Seal, dry.....	11 @11
Zinc, V. M. French, in Poppy Oil.....	11 @11
Green Seal.....	11 @11
Lots of 1 ton and over.....	13 1/2 @13 1/2
Lots of less than 1 ton.....	13 1/2 @13 1/2
Zinc, V. M. French, in Poppy Oil.....	13 1/2 @13 1/2
Red Seal.....	13 1/2 @13 1/2
Lots of 1 ton and over.....	11 1/2 @12 1/2
Lots of less than 1 ton.....	12 1/2 @12 1/2
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1 1/2; 25 bbls., 2%; 50 bbls., 4%.....	12 1/2 @12 1/2

White Lead, Zinc, &c.—

White Lead, Zinc, &c.—	lb
Lead, English white, in Oil.....	9 1/2 @10
Lead, American white, in Oil.....	9 1/2 @10
Lots of 500 lb or over.....	7 1/2 @7 1/2
Lots less than 500 lb.....	8 @8
In Barrels.....	6 1/2 @6 1/2
Lead, White, in oil, 25 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 12 1/2 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 1 to 5 lb.....	14 @14
as'ted tins, add to keg price.....	1 1/2 @1 1/2
Lead, American, Terms: For lots 12 tons and over 1/4 rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.....	6 1/2 @6 1/2
Lead, White, Dry, in bbls.....	6 1/2 @6 1/2
Zinc, American, dry.....	5 1/2 @5 1/2
Zinc, French.....	5 1/2 @5 1/2
Antwerp, Red Seal, dry.....	8 1/2 @8 1/2
Antwerp, Green Seal, dry.....	10 1/2 @10 1/2
Paris, Red Seal, dry.....	9 1/2 @9 1/2
Paris, Green Seal, dry.....	11 @11
Zinc, V. M. French, in Poppy Oil.....	11 @11
Green Seal.....	11 @11
Lots of 1 ton and over.....	13 1/2 @13 1/2
Lots of less than 1 ton.....	13 1/2 @13 1/2
Zinc, V. M. French, in Poppy Oil.....	13 1/2 @13 1/2
Red Seal.....	13 1/2 @13 1/2
Lots of 1 ton and over.....	11 1/2 @12 1/2
Lots of less than 1 ton.....	12 1/2 @12 1/2
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1 1/2; 25 bbls., 2%; 50 bbls., 4%.....	12 1/2 @12 1/2

White Lead, Zinc, &c.—

White Lead, Zinc, &c.—	lb
Lead, English white, in Oil.....	9 1/2 @10
Lead, American white, in Oil.....	9 1/2 @10
Lots of 500 lb or over.....	7 1/2 @7 1/2
Lots less than 500 lb.....	8 @8
In Barrels.....	6 1/2 @6 1/2
Lead, White, in oil, 25 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 12 1/2 lb tin.....	14 @14
paids, add to keg price.....	1 @1
Lead, White, in oil, 1 to 5 lb.....	14 @14
as'ted tins, add to keg price.....	1 1/2 @1 1/2
Lead, American, Terms: For lots 12 tons and over 1/4 rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.....	6 1/2 @6 1/2
Lead, White, Dry, in bbls.....	6 1/2 @6 1/2
Zinc, American, dry.....	5 1/2 @5 1/2
Zinc, French.....	5 1/2 @5 1/2
Antwerp, Red Seal, dry.....	8 1/2 @8 1/2
Antwerp, Green Seal, dry.....	10 1/2 @10 1/2
Paris, Red Seal, dry.....	9 1/2 @9 1/2
Paris, Green Seal, dry.....	11 @11
Zinc, V. M. French, in Poppy Oil.....	11 @11
Green Seal.....	11 @11
Lots of 1 ton and over.....	13 1/2 @13 1/2
Lots of less than 1 ton.....	13 1/2 @13 1/2
Zinc, V. M. French, in Poppy Oil.....	13 1/2 @13 1/2
Red Seal.....	13 1/2 @13 1/2
Lots of 1 ton and over.....	11 1/2 @12 1/2
Lots of less than 1 ton.....	12 1/2 @12 1/2
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1 1/2; 25 bbls., 2%; 50 bbls., 4%.....	12 1/2 @12 1/2

White Lead, Zinc, &c.—

Zinc, French:	
Antwerp, Red Seal, dry.....	8

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33% @ 33% & 10% signifies

that the price of the goods in question ranges from 33% per cent. discount to 33% and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00.....33%
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, $\frac{1}{2}$ doz. pair, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Anvils—American—

Eagle Anvils..... $\frac{1}{2}$ doz. @ \$1.50
Hay-Budden, Wrought..... $\frac{1}{2}$ doz. @ \$1.50
Trenton..... $\frac{1}{2}$ doz. @ \$1.50

Imported—

Peter Wright & Sons, $\frac{1}{2}$ doz. 64 to 340 lb. 11¢; 350 to 600 lb. 11½¢.

Anvil, Vise and Drill—

Millers Falls Co., \$18.00.....15¢10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....33%4%

Augers and Bits—

Com. Double Spur.....75¢75¢10%

Jennings' Patn., reg. Anvil.....50¢10%

Black Lip or Blued.....60¢10%

Boring Mach. Augers.....70¢10%

Car Bits, 12-in. twist.....60¢10%

Ford's Auger and Car Bits.....60¢5%

Pt. Washington Auger Co., Concord's.....35%

Forstner Pat. Auger Bits.....35%

C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list.....5%

No. 30, R. Jennings' list.....40¢75%

Russell Jennings.....50¢10%2%

L'Honnemieu Car Bits.....15%

Mayhew's Countersink Bits.....45%

Pugh's Black.....50%

Pugh's Jennings' Pattern.....50%

Snell's Auger Bits.....50%

Snell's Bell Hangers' Bits.....50%

Snell's Car Bits, 12-in. twist.....50%

Snell's King Auger Bits.....50%

Wright's Jennings' Bits.....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, 15¢; large, 35¢.....50¢10%

Clark's Pattern, No. 1, $\frac{1}{2}$ doz. 35¢;
No. 2, 15¢.....60¢10%10%

Ford's, Clark's Pattern.....60%

Lavigne Pat., small size, 15¢; large size, 35¢.....70¢10%

Swan's.....80%

Gimlet Bits—

Common Dble. Cut.....\$3.00@3.25

German Pattern, Nos. 1 to 10,
\$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz. \$5.50@6.00

Ames.....\$6.00@6.50

Universal.....\$6.00@6.50

Wood's Universal.....\$6.00@6.50

Ship Augers and Bits—

Ship Augers.....\$4.50@5.00

Ford's.....\$3.50@4.00

C. E. Jennings & Co.:
L'Honnemieu's.....15%

Watrous'.....33%7%

Snell's.....40%

Awl Hfts—See Handles, Mechanics' Tool.

Awls—

Brad Awls:
Handled.....gro. \$2.75@3.00

Unhdded, Shldered.....gro. \$3.00@3.25

Unhdded, Patent.....gro. \$3.00@3.25

Peg Awls:
Unhdded, Patent.....gro. \$1.50@1.75

Unhdded, Shldered.....gro. \$1.50@1.75

Scratch Awls:
Handled, Com.....gro. \$3.50@4.00

Handled, Socket.....gro. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$1.75@5.00

Second Quality.....\$1.25@4.50

Double Bit, base weights: Per doz.
First Quality.....\$7.00@7.50

Second Quality.....\$6.50@7.75

Axle Grease—

See Grease, Axle

Axles—

Iron or Steel

Concord, Loose Collar.....45¢5%

Concord, Solid Collar.....35¢5%

No. 1 Common, Loose.....35¢5%

No. 1½ Com., New Styles.....45¢5%

No. 2 Solid Collar.....35¢4%

Half Patent:
Nos. 7, 8, 11 and 12.....70¢75%

Nos. 13 to 14.....70¢75%

Nos. 15 to 18.....75¢75%5%

Nos. 19 to 22.....75¢75%5%

Boxes, Axle—

Common and Concord, not turned lb., 45¢@5¢

Common and Concord, turned lb., 55¢@6¢

Half Patent.....lb., 95¢@10¢

Bait—

Fishing—

Hendryx.....20%

A Bait.....20%

B Bait.....20%

Competitor Bait.....20%

Balances—

Sash—

Caldwell new list.....50%

Pullman.....50¢10¢60%

Spring—

Spring Balances.....50¢10¢60%

Chatillon's.....50¢10%

Light Spg. Balances.....50¢10%

Straight Balances.....40¢60%

Circular Balances.....50¢10%

Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars—

Crow—

Steel Crowbars, 10 to 40 lb. per lb., 3¢@3½¢

Towel

No. 10 Ideal, Nickel Plate..... $\frac{1}{2}$ gro. \$4.50

Beams, Scale—

Scale Beams.....40¢5¢@40¢10%

Chatillon's No. 1.....30%

Chatillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 13 Wire Timed $\frac{1}{2}$ doz.....\$0.75

No. 12 Wire Coppered $\frac{1}{2}$ doz.....\$0.75

Tinned.....\$0.85

No. 11 Wire Coppered $\frac{1}{2}$ doz.....\$1.10

Tinned.....\$1.20

No. 10 Wire Galvanized..... $\frac{1}{2}$ doz. \$1.50

Western W. G. Co.:
No. 1 Electric..... $\frac{1}{2}$ gro. \$7.80

No. 2 Buffalo..... $\frac{1}{2}$ gro. \$9.00

No. 3 Perfection Dust..... $\frac{1}{2}$ gro. \$8.00

Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, \$0.80; No. 1, Jap'd, \$1.15; No. 1, Tin'd, \$1.

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong... per lb. 1.45¢
 Sharp, 1 prong... per lb. 1.45¢
 Burke's Blunt, 4¢; Sharp, 4¢
 Gautier, Blunt, 4¢; Sharp, 4¢
 Perkins, Blunt, 4¢; Sharp, 4¢

Can Openers—

See Openers, Can.

Cans, Milk—

Illinois Pattern... 1.35 1.85 2.35 each.
 New York Pattern... 1.50 2.20 2.45 each.
 Baltimore Pattern... 1.50 2.20 2.45 each.
 Dubuque... 1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
 3 5 10 gal.
 \$18.00 60.00 129.60 gro., net.

Caps, Percussion—

Eley's E. B. 5¢
 G. D. 5¢
 F. L. 5¢
 G. E. 5¢
 Musket 5¢

Primers—

Berdan Primers, 3¢ per M. 20¢
 B. L. Caps (Sturtevant Shell) 3¢ per M. 30¢
 All other primers per M. 1.50¢

Cartridges—

Blank Cartridges:
 32 C. F., \$5.50... 10¢
 32 C. F., \$7.00... 10¢
 22 cal. Rim, \$1.50... 10¢
 22 cal. Rim, \$2.75... 10¢
 B. B. Caps, Con. Ball, Svcd. \$1.90
 B. B. Caps, Round Ball... \$1.40
 Central Fire... 25¢
 Target and Sporting Rifle... 15¢
 Primed Shells and Bullets... 15¢
 Rim Fire, Sporting... 50¢
 Rim Fire, Military... 15¢

Casters—

Bed 70¢
 Plate 60¢
 Philadelphia 75¢
 3cm, Ball Bearing... 70¢
 Boss Anti-Friction... 70¢
 Boss Anti-Friction... 70¢
 Gem (Roller Bearing)... 80¢
 Martin's Patent (Phoenix)... 45¢
 Standard Ball Bearing... 45¢
 Tucker's Patent low list... 35¢
 Yale (Double Wheel) low list... 30¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coil—

American Coil, Straight Link:
 5-16 1/4 5-16 3/4 7-16 1/2 9-16
 \$8.90 6.10 5.10 4.10 4.25 4.15 4.10
 3/4 3/4 3/4 to 1-16 1 1/2 to 1 1/2 inch.
 \$4.00 3.50 3.65 3.95

German Coil... 60¢ to 10¢ to 70¢**Halter—**

Halter Chains... 60¢ to 60¢ to 10¢
 German Pattern Halter Chains,
 list July 21, '97... 60¢ to 10¢ to 10¢
 Covert Mfg. Co. 35¢

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
 6 1/2-6 3/4, Straight, with ring \$25.00
 6 1/2-6 3/4, Straight, with ring \$26.00
 6 1/2-8 1/4, Straight, with ring \$30.00
 6 1/2-10 1/4, Straight, with ring \$35.00

NOTE—Add 2¢ per pair for Hooks.
 Twist Traces: add per pair for Nos. 2
 and 3, 2¢; No. 1, 3¢; No. 0, 4¢ to price of
 Straight Link.

Eastern Standard Traces, Wag-
 on Chain, &c... 60¢ to 10¢

Miscellaneous—

Jack Chain, list July 10, '93:
 Iron... 60¢ to 10¢
 Brass... 60¢ to 10¢
 Safety and Plumbers' Chain... 70¢
 Gal. Pump Chain... 10¢ to 4¢
 Covert Mfg. Co.:
 Breast, Halter, Heel, Rein, Stal-
 lion... 40¢
 Oneida Community:
 Am. Dog Leads and Kennel Chains... 40¢ to 45¢
 Niagara Dog Leads and Kennel
 Chains... 45¢ to 60¢
 Wire Goods Co.:
 Dog Chain... 70¢ to 10¢
 Universal Dog-Jointed Chain... 50¢

Chain and Ribbon, Sash—

Oneida Community:
 Copper Chain, 60¢; Steel Chain... 60¢

Pullman:

Bronze Chain, 60¢; Steel Chain... 60¢ to 10¢
 Sash Chain Attachments, per set... 8¢
 Aluminum Sash Ribbon, per 100
 ft... \$1.25 to \$3.00
 Sash Ribbon Attachments, per set... 8¢

Chalk—(From Jobbers.)

Carpenters' Blue... 45¢ to 55¢
 Carpenters' Red... 40¢ to 50¢
 Carpenters' White... 35¢ to 45¢

Checks, Door—

Bardsley's... 45¢
 Pullman, per gro... \$34.00
 Russwin... 33¢

Chests, Tool—

American Tool Chest Co.:
 Boys' Chests, with Tools... 55¢
 Youths' Chests, with Tools... 40¢
 Gentlemen's Chests, with Tools... 30¢
 Farmers' Carpenters', etc., Chests,
 with Tools... 20¢

Machinists' and Pipe Fitters'
 Chests, Empty... 30¢
 Tool Cabinets... 30¢
 C. E. Jennings & Co.'s Machinists'
 Tool Chests... 30¢ to 10¢

Chisels—

Socket Framing and Firmer
 standard List... 75¢ to 10¢ to 10¢ to 65¢
 Buck Bros... 30¢
 Charles Buck Edge Tool Co... 30¢
 C. E. Jennings & Co.:
 Socket Firmer No. 10... 60¢
 Socket Framing No. 15... 60¢
 Swan's... 75¢
 L. & I. J. White Co... 30¢ to 65¢

Tanged—

Tanged Firmers... 53¢ to 10¢
 Buck Bros... 30¢
 Charles Buck Edge Tool Co... 30¢
 C. E. Jennings & Co. Nos. 191 181 25¢
 L. & I. J. White Co... 25¢ to 5¢

Cold—

Cold Chisels, good quality... 13¢ to 15¢
 Cold Chisels, fair quality... 11¢ to 12¢
 Cold Chisels, ordinary... 9¢ to 10¢

Chucks—

Almond Drill Chucks... 35¢
 Almond Turret Six-Tool Chuck... 40¢
 Beach Pat., each \$8.00... 35¢ to 5¢
 Empire... 25¢
 Blackhawk... 25¢
 Jacobs' Drill Chucks... 35¢
 Pratt's Positive Drive... 25¢
 Skinner Patent Chucks:
 Independent Lathe Chucks... 40¢
 Universal, Reversible Jaws... 40¢
 Combination, Reversible Jaws... 40¢
 Drill Chucks, New Model... 25¢
 Standard, 40¢ to 10¢; Skinner Pat.
 25¢; Positive Drive... 40¢
 Planer Chucks... 30¢
 Face Plate Jaws... 40¢
 Standard Tool Co.:
 Improved Drill Chuck... 45¢
 Union Mfg. Co.:
 Combination, Nos. 1, 2, 3, 4, 5, 6,
 7, 8 and 17, 40¢; No. 21... 35¢
 Scroll Combination, Nos. 82 and
 84... 30¢
 Geared Scroll, Nos. 33, 34 and 35... 30¢
 Independent Iron, Nos. 18 and 318... 35¢
 Independent Steel, No. 64... 25¢
 Union Drill, Nos. 000, 00, 100, 101,
 102, 103, 104... 35¢
 Union Czar Drill... 25¢
 Universal 11, 12, 16, 17, 13, 14, 15, 35¢
 Universal, No. 42... 30¢
 Iron Face Plate Jaws, Nos. 28, 30,
 48 and 50... 35¢
 Steel Face Plate Jaws, Nos. 70 and
 72... 30¢
 Westcott Patent Chucks:
 Lathe Chucks... 50¢
 Little Giant Auxiliary Drill... 50¢
 Little Giant Double Grip Drill... 50¢
 Little Giant Drill, Improved... 50¢
 Quick Drill... 50¢
 Scroll Combination Lathe... 50¢

Clamps—

Adjustable, Hammers... 20¢ to 20¢ to 5¢
 Carriage Makers', P. S. & W.
 Co... 40¢ to 10¢ to 50¢
 Realy, Parallel... 33¢ to 10¢
 Lineman's, Utica Drop Forge & Tool
 Co... 40¢
 Wood Workers, Hammers... 40¢ to 10¢
 Saw Clamps, see Vices, Saw Filers

Cleaners, Drain—

Iwan's Champion, Adjustable... 55¢
 Iwan's Champion, Stationary... 45¢

Sidewalk—

Star Shank, All Steel, 3/4 doz. \$4.05 net
 Star Shank, All Steel, 3/4 doz. \$3.24 net
 W. & C. Shank, All Steel, 3/4 doz.,
 7 1/2 in., \$3.00; 8 in., \$3.25.

Cleavers, Butchers'—

Foster Bros... 30¢
 Fayette R. Plumb... 30¢
 L. & I. J. White Co... 30¢

Clippers, Horse and**Sheep—**

Chicago Flexible Shaft Company:
 1902 Chicago Horse, each \$10.75
 20th Century Horse, each \$5.00
 Lightning Belt Horse, each \$15.00
 Chicago Belt Horse, each \$20.00
 Stewart's Enclosed Gear
 Horse, each... \$9.75
 Stewart's Patent Sheep Shear-
 ing Machine, each... \$12.75
 Stewart Enclosed Gear Shear-
 ing Machine, No. 8, each... \$9.75

Clips, Axle—

Regular Styles, list July 1, '05. 60¢

Cloth and Netting, Wire

—See Wire, &c.

Cocks, Brass—

Hardware list:
 Plain Bibbs, Globe, Kerosene,
 Racking, Liquor, Bottling,
 &c... 70¢
 Compression Bibbs... 65¢ to 10¢

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
 Son's list... 40¢
 Leather, Walter B. Stevens & Son's
 list... 40¢

Combs, Curry—

Metal Stamping Co... 40¢

Compasses, Dividers, &c.

Ordinary Goods... 70¢ to 10¢ to 75¢
 Wm. Schollhorn Co.:
 Excelsior Dividers... 55¢
 Lodi Dividers... 75¢

Conductor Pipe,—

L. O. L. to Dealers:

Galvanized
 Steel Charcoal Copper.
 Iron, 14, 16, 21 oz.

Eastern:
 60¢ to 30¢ 60¢ to 21¢ 30¢ to 10¢ to 21¢

Central:
 70¢ 55¢ to 71¢ 30¢ to 16¢

Western and Southern:
 65¢ to 10¢ 55¢ to 21¢ 30¢ to 71¢

No. Western
 62 1/2¢ to 71¢ 50¢ to 55¢ 30¢ to 65¢

Terms, 60 days; 2% cash 10 days. Fac-
 tory shipments generally delivered.

See also Eave Troughs.

Coolers, Water—

Gal, each... 2 3 4 6 8
 Labrador... \$1.20 \$1.50 \$1.80 \$2.10 \$2.70
 Gal... 3 4 6 8
 Iceland, ea... \$1.80 \$2.10 \$2.40 \$3.00

Galvanized, ea... \$1.55 \$2.00 \$2.25 \$2.90 \$3.90
 Galvanized, Lined, side handles,
 Gal... 2 3 4 6 8
 Each... \$1.95 \$2.15 \$2.40 \$3.30 \$4.15

White Enameled, 25¢; Agate Lined, 25¢

Coopers' Tools—

See Tools, Coopers'.

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair
 and heavier, 23¢; lighter than
 3 lb. to pair... 25¢

Cord— Sash—

Braided, Drab... 1b. 35¢
 Braided, White, Com. Nos. 8
 to 12, 24¢; No. 7, 24¢; No. 6,
 25¢.

Cable Laid Italian—

lb., A, 18¢; B, 16¢
 Common India... 1b. 10¢ to 10 1/2¢
 Cotton Sash Cord, Twisted, 17¢ to 19¢
 Patent Russia... 1b. 11¢ to 14¢

Cable Laid Russia... 1b. 11¢ to 15¢
 India Hemp, Br'd'd. 1b. 18¢ to 18 1/2¢
 India Hemp, Twisted, 1b. 12¢ to 13¢

Patent India, Twisted, 1b. 12¢ to 13¢
 Anniston Cordage Co.: 3/4 lb. solid
 White Cord, Nos. 8 to 12, \$0.34; No. 7,
 \$0.24; No. 6, \$0.25; 3/4 doz. 50 ft.,
 \$0.24; 50 ft., Columbia, \$0.85;

50 ft., Vectors, \$1.00; 50 ft., 6-Thread,
 \$1.10; 60 ft., 3-Thread, \$0.95; 50 ft.,
 Manila, \$1.40; 60 ft., Jute, \$0.75.

Pearl Braided, cotton, No. 6, 3/4 lb.,
 25¢; No. 7, 25¢; No. 8 to 12, 24¢
 Edwinton, Braided, Nos. 8 to 10,
 25¢; 7, 25¢; 6, 25¢.

Harmony Cable Laid Italian, Nos. 7
 to 10... 1b. 23¢
 Pullman:

Wire Sash Cord... 18¢
 Sash Cord Attachments, per doz. 18¢
 Samson, Nos. 8 to 12:

Braided, 3/4 lb., Drab Cotton,
 55¢; Italian Hemp, 40¢ to
 50¢; Linen, 55¢; White Cot-
 ton, 50¢; Spot Cord... 50¢

Massachusetts, White... 1b. 45¢
 Massachusetts, Drab... 1b. 45¢
 No. 7, 25¢; No. 6, 30¢

Phoenix, White, Nos. 8 to 12, 27¢;
 Silver Lake, per lb.:
 A, Drab, 45¢; A, White, 40¢;
 B, Drab, 40¢; B, White, 35¢;
 Italian Hemp, 40¢; Linen... 57¢

See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906... 85¢ to 10¢ to 10¢
 Hendryx Standard Wire Picture Cord,
 old list, 85¢ to 10¢

Cradles—

Grain... 40¢ to 10 1/2¢

Crayons—

White Round Crayons, Cases, 100
 gro., \$6.50 to \$7.50 at factory, but
 lower prices made by jobbers
 Zelnicker's Lumber... 3/4 gro.
 White and Purple, Indelible... 47.50
 Blue, Red, Green, Yellow and
 Terra Cotta, \$6.50; Black... \$4.00
 Genuine Soapstone, Metal Workers',
 5 in. x 1/4 in. Round, \$2.50; 5 in. x
 1/4 in. Square, \$1.75; 5 x 1/2 x 3-16,
 \$2.50; 5 x 1 1/4 x 3-16... \$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, \$7.00;
 Light... \$6.50

Crow Bars—See Bars, Crow.**Cultivators—**

Victor Garden... 50¢

Cutlery, Table—

International Silver Company:
 No. 12 M'd'm Knives, 1847, 3/4 doz. \$3.50
 Star, Eagle, Rogers & Hamilton
 and Anchor... 3/4 doz. \$3.00
 Wm. Rogers & Son... 3/4 doz. \$2.50

Cutters— Glass—

H. H. Mayhew Co... 40¢
 Red Devil... 50¢
 Smith & Hemenway Co... 50¢
 Woodward... 40¢

Meat and Food—

American... 30¢
 Nos... 2 3 4 B 5
 Each... \$7 \$10 \$25 \$50 \$60

Enterprise:
 Nos... 5 10 12 22 32
 Each... \$2 \$3 \$2.75 \$4.50 \$6 25¢ to \$7 1/4¢
 No. 202, \$1.50... 10¢ to 71¢
 Dix's... 3/4 doz. 30¢ to 65¢

Nos... 3 4 5
 \$14.00 \$17.00 \$19.00 \$30.00

Ideal... 40¢ to 40¢ to 5¢
 Little Giant... 3/4 doz. 40¢ to 50¢
 Nos... 305 \$10 \$12 \$20 \$22
 \$35.00 \$48.00 \$14.00 \$72.00 \$68.00

N. E. Food Choppers... 25¢
 New Triumph No. 605, 3/4 doz. \$24.00.

Russwin Food, No. 1, \$24.00; No. 2,
 \$27.00
 Woodruff's... 3/4 doz. 30¢ to 45¢
 Nos... 100 150
 \$15.00 \$18.00

Enterprise Beef Shavers... 25¢ to 30¢

Slaw and Kraut—

Henry Disston & Sons:

Slaw and Kraut Cutters, Corn
 Graters, &c... 35¢
 J. M. Mast Mfg. Co.:
 Slaw Cutters, 1 Knife... 3/4 doz. \$3.00
 Combined Slaw Cutter and Corn
 Grater... 3/4 doz. \$4.00

Tucker & Dorsey Mfg. Co.:
 Kraut Cutters... 40¢
 Slaw Cutters, 1 Knife... 3/4 doz. \$18.00
 Slaw Cutters, 2 Knife... 3/4 gr. \$22.00 to \$36

Tobacco

All Iron, Cheap... doz. \$4.25 to \$4.50
 Enterprise... 25¢ to 30¢
 National, 3/4 doz., No. 1, \$21; No. 2,
 \$18

Diggers, Post Hole, &c.—

Disston's:
 Rapid, 3/4 doz., \$24.00... 25¢
 Samson, 3/4 doz., \$34.00... 25¢
 Iwan's Improved Post Hole Auger... 40¢
 Vaughan Pattern Post Hole Augers

Perfection Post Hole Diggers, 3/4
 doz... \$8.75
 Split Handie Post Hole Diggers,
 3/4 doz... \$7.75

Kohler's, 3/4 doz., Universal, \$14.00;
 Little Giant, \$12.00; Hercules,
 \$10.00; Invincible, \$9.00; Rival,
 \$8.00; Pioneer... \$7.00

Never-Break Post Hole Diggers, 3/4
 doz., \$24.00... 60¢

Dividers—See Compasses.**Drawers, Money—**

Tucker's Pat. Alarm Till No. 1, 3/4
 doz., \$18; No. 2, \$15; No. 3, \$12;
 No. 4, \$10.

Drawing Knives—

See Knives, Drawing.

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers... 35¢
 Sterling Wheel Dresser Cutters... 35¢

Drills and Drill Stocks—

Blacksmiths' Common Drilling
 Machines... \$1.50 to \$1.75

Breast, Millers Falls... 40¢
 Breast, P. S. & W... 40¢
 Goodell Automatic Drills... 50¢ to 100¢
 Johnson's Automatic Drills, Nos. 2
 and 3... 16¢

Johnson's Drill Points... 16¢
 Millers Falls Automatic Drills... 33¢ to 40¢
 Ratchet, Curtis & Curtis... 25¢

Ratchet, Parker's... 40¢
 Ratchet, Weston's... 40¢
 Ratchet, Weston's, Style H Im-
 proved... 40¢

Ratchet, No. 012... 40¢
 Ratchet, Celebrated... 40¢
 Ratchet, Whitney's, P. S. & W... 50¢
 Whitney's Hand Drill No. 1, \$10.00;
 Adjustable, No. 10

Extractors, Lemon Juice**Fasteners, Blind—**
—See Squeezers, Lemon.

Zimmerman's 50¢10%
Wallings 50¢10%

Cord and Weight—

Ives 33%

Faucets—

Cork Lined 50¢10%
Metallic Key, Leather Lined 60¢10%
Red Cedar 60¢10%
Petroleum 70¢10%
B. & L. H. Co.:
Metal Key 60¢10%
Star 60¢
West Lock 50¢10%
John Sommer's Peerless Tin Key 40¢
John Sommer's Boss Tin Key 50¢10%
John Sommer's Victor Mtd. Key 50¢10%
John Sommer's Duplex Metal Key 40¢
John Sommer's Diamond Lock 40¢
John Sommer's I. X. L. Cork Lined 50¢
John Sommer's Reliable Cork Lined 50¢10%
John Sommer's Chicago Cork Lined 60¢
John Sommer's O. K. Cork Lined 50¢
John Sommer's No. Brand, Cedar 40¢
John Sommer's Perfection, Cedar 40¢
McKenna, Brass:
Burglar Proof, N. P. 25¢
Improved, 1/4 and 1/2 inch 25¢
Self Measuring:
Enterprise, 1/2 doz. \$36.00 40¢10%
Lane's, 1/2 doz. \$36.00 40¢10%
National Measuring, 1/2 doz. \$36.00 40¢10%

Felice Plates—

See Plates, Felice.

Files— Domestic—

List Nov. 1, 1899.

Best Brands 70¢10%
Standard Brands 75¢10%
Lower Grade 75¢10%

Imported—

Stubs' Tapers, Stubs' Hat, July 24, '97 33 1-3@40%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 43.75
Fusible Links, No. 36 50¢
Expansion Bolts, No. 107 60¢10%

Grindstone—

Net Prices:
Inch 15 17 19 21
Per doz. \$3.25 3.75 4.25 4.75
P. S. & W. Co. 40¢10%
Standard Hardware Co. 60¢
Stowell's Giant Grindstone Hanger 40¢
Stowell's Grindstone Fixtures, Extra Heavy, 40¢10%; Light 50%

Fodder Squeezers—

See Compressors.

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Easy Potato 60¢10%
Victor, Hay 60¢15%
Victor, Manure 60¢
Victor, Header 60¢
Champion, Hay 60¢
Champion, Header 60¢
Champion, Manure 60¢
Columbia, Hay 60¢
Columbia, Header 60¢
Columbia, Spading 70¢12%
Hawkeye Wood Barley 60¢
W. & C. Potato Digger 60¢10%
Acme Hay 60¢10%
Acme Manure, 4 line 60¢10%
Dakota Header 60¢20%
Jackson Steel Barley 60¢20%
Kansas Header 60¢
W. & C. Favorite Wood Barley 40¢
Plated.—See Spoons.

Frames— Saw—

White, S'g't Bar, per doz. 75¢80¢
Red, S'g't Bar, per doz. \$1.00(1.25)
Red, Dbl. Brace, per doz. \$1.40(1.50)

Freezers, Ice Cream—

Qt. 1 2 3 4 6
Each \$1.30 \$1.60 \$1.90 \$2.20 \$2.50

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse— Per 1000 Feet.**

Hemp 2.75
Cotton 3.20
Waterproof Sgl. Taped 3.65
Waterproof Dbl. Taped 4.40
Waterproof Tpl. Taped 5.15

Gates, Molasses and Oil—

Stebbins' Pattern 80¢10%

Gauges—

Marking, Mortise, &c. 50¢50¢10%
Chapin-Stephens Co.:
Marking, Mortise, &c. 50¢50¢10%
Scholl's Patent 50¢10%
Door Hangers 50¢50¢10%
Dinstein's Marking, Mortise, &c. 50¢
Stanley R. & L. Co.'s Butt and Rabbit Gauge 30¢
Marking and Mortise 50¢
Wire, Brown & Sharpe's 25¢
Wire, Morse's 25¢
Wire, P. S. & W. Co. 30%

Gimlets— Single Cut—

Numbered assortments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.30

Spike, Metal, No. 1, \$4.00; 2, \$4.30

Nail, Wood Handled, No. 1, \$2.30; 2, \$2.60

Spike, Wood Handled, No. 1, \$4.30; 2, \$4.60

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co. 60¢60¢10%

Glue, Liquid Fish—

Bottles or Cans, with Brush 25¢10%
International Glue Co. (Martin's) 40%

Grease, Axle—

Common Grade gro. \$4.50@6.00

Dixon's Everlasting, 10-lb pails, ea. 50¢; in boxes, 1/2 doz., 1 lb. \$1.20

2 lb. \$2.00

Helmet Hard Oil 25%

Griddles, Soapstone—

Pike Mfg. Co. 33%@33%10%

Grindstones—

Pike Mfg. Co.:
Improved Family Grindstones, 1/2 inch, 1/2 doz., \$2.00 33%
Royal Mfg. Co.:
Alumund Grinding Machines, each, Nos. 01, \$1.75; 1A, \$2.50; 10, \$5.00 30%
Alumund Sickle Grinders, each, Nos. 20A, \$6.00; 20A Combined, \$6.50 30%
Alumund Disc Grinders, each, \$2.50 30%

Grips, Nipple—

Perfect Nipple Grips 40¢10%2%

Halters and Ties—

Cow Ties 60¢10%60¢10%5%

Covert Mfg. Co.:
Web 30¢2%
Jute Rope 30¢
Sisal Rope 45¢
Cotton Rope 45¢
Hemp Rope 45¢
Oneida Community:
Am. Coil and Halters 40¢40%5%
Am. Cow Ties 45¢50%
Niagara Coil and Halters 45¢50%5%
Niagara Cow Ties 45¢50%10%5%

Hammers—**Handled Hammers—**

Heller's Machinists' 55¢10%55¢10%5%
Heller's Farriers' 40¢50¢10%5%
Magnet Tack, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Hammers—**Handled Hammers—**

Heller's Machinists' 55¢10%55¢10%5%
Heller's Farriers' 40¢50¢10%5%
Magnet Tack, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553,

Screw Hook and Eye:
 1/2 to 1 inch.....lb. 6¢
 1/2-inch.....lb. 7¢
 1/2-inch.....lb. 8¢

Hitchers, Stall—
 Covert Mfg. Co., Stall Hitchers.....30¢2¢
Hods— Coal—

Per doz.
 Inch.....15 16 17 18
 Galv. Open.....\$2.50 2.75 3.00 3.25
 Jap. Open.....\$1.90 2.10 2.25 2.35
 Galv. Funnel.....\$3.00 3.30 3.60 3.90
 Jap. Funnel.....\$2.45 2.65 2.85 3.30

Masons' Etc.—
 Cleveland Wire Spring Co.:
 Steel Brick, No. 162.....each \$1.05
 Steel Mortar, No. 158.....each \$1.35

Hoos— Eye—
 Scovill and Oval Pattern.....
 60¢10¢60¢10¢10¢
 Grub, list Feb. 23, 1899.....
 70¢10¢75¢10¢

D. & H. Scovill.....30¢
Handled—
 NOTE—Manufacturers are selling from the list of September 1, 1904, but many jobs are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, \$2.75; No. 2, \$2.50
 Star Double Bit.....\$3.20
 Ft. Madison Cotton Hoe.....10¢10¢10¢
 Ft. Madison Crescent Cultivator Hoe.....
 70¢10¢
 Ft. Madison Mattock Hoe.....
 60¢75¢
 Regular Weight.....doz. 60¢75¢
 Junior Size.....doz. \$4.00
 Ft. Madison Sprouting Hoe.....doz. \$4.00
 Ft. Madison Dixie Tobacco Hoe.....
 75¢10¢10¢
 Kretzinger's Cut Easy.....doz. 45¢10¢
 Warren Hoe.....doz. 45¢10¢
 W. & C. Ivanhoe.....doz. 75¢2¢
 B. B. 6 in., Cultivator Hoe.....\$3.15
 B. B. 6 1/2 in., Cultivator Hoe.....\$3.35
 Acme Weeding.....doz. net, \$4.35
 W. & C. L. tuing Shufle Hoe.....doz. \$4.35

Hoisting Apparatus—
 See Machines, Hoisting.

Holders— Bit—
 Angular, 1/2 doz. \$24.00.....45¢10¢

Door—
 Bardeley's, Iron, 40%; Brass and Bronze.....33¢4¢
 Lumber.....50¢
 Pullman.....35¢
 Superior.....33¢4¢

File and Tool—
 Nicholson File Holders and File Handles.....33¢40¢

Fruit Jar—
 Triumph Fruit Jar Holder, 1/2 gross, \$10.50; 1 doz. \$1.25

Trace and Rein—
 Fernald Double Trace Holder, 1/2 doz. pairs.....\$1.25
 Dash Rein Holder, 1/2 doz. pairs.....\$1.25

Hones—Razor—
 Pike Mfg. Co., Belgian, German and Swat.....40¢

Hooks—Cast Iron—
 Bird Cage, Reading.....40¢
 Clothes Line, Reading List.....40¢
 Clothes Line, Stowell's.....70¢
 Coat and Hat, Reading.....45¢20¢
 Coat and Hat, Stowell's.....70¢
 Coat and Hat, Wrightsville.....65¢
 Harness, Reading List.....40¢
 Harness, Stowell's.....70¢
 School House, Stowell's.....70¢

Wire—
 Belt.....80¢10¢
 Wire C. & H. Hooks.....75¢10¢75¢10¢10¢
 Columbian Hdv Co. Gem.....70¢10¢
 Parker Wire Goods Co. King.....70¢10¢
 Western W. G. Co. Molding.....75¢
 Wire Goods Co.:
 Acme, 60¢10¢; Chief, 70¢; Crown, 75¢; Czar, 65¢; V. Brace, 75¢; Czar Harness, 50¢10¢.

Wrought Iron—
 Box, 6 in., per doz., \$1.00; 8 in., \$1.25; 10 in., \$1.50.
 Cotton.....doz. \$1.05¢1.25

Wrought Staples, Hooks, &c.— See Wrought Goods

Miscellaneous—
 Hooks, Bench, see Staps, Bench.
 Bush, Light, doz. \$1.75; Medium, \$3.35; Heavy, \$6.25
 Grass, best, all sizes, per doz. \$1.60
 Grass, common grades, all sizes, per doz. \$1.39
 Whiffletree.....lb. 5¢10¢

Hooks and Eyes:
 Brass.....60¢5¢60¢10¢5¢
 Malleable Iron.....70¢70¢10¢
 Covert Mfg. Co. Gate and Scuttle Hooks.....40¢
 Ft. Madison Cut-Easy Corn Hooks, 1/2 doz. \$3.25 net

Bench Hooks—See Bench Staps.
 Corn Hooks—See Knives, Corn.

Horse Nails—
 See Nails, Horse.

Horseshoes—
 See Shoes, Horses.

Hose, Rubber—
 Garden Hose, 1/4-inch:

Competition.....ft. 5 @ 6¢
 3-ply Guaranteed, ft. 2 @ 9¢
 4-ply Guaranteed, ft. 10 @ 11¢
 Cotton Garden, 1/4-in., coupled:
 Low Grade.....ft. 8 @ 9¢
 Fair Quality.....ft. 10 @ 11¢

Iron— Sad—
 From 1 to 10.....lb. 8¢35¢
 R. B. Sad Iron.....lb. 1/4¢35¢
 Mrs. Potts, cents per set:
 Nos. 80 85 60 65
 Jap'd Tops.....05 02 75 72

Tin'd Tops.....70 67 80 77
 New England Pressing, lb. 3/4¢1¢
 Pinking.....doz. 60¢

Irons, Soldering
 See Cop.ers.

Jacks, Wagon—
 Covert Mfg. Co.:
 Auto Screw.....30¢2¢; Steel, 45¢
 Lockport.....50¢
 Lane's Steel.....30¢10¢2¢
 Richards' Tiger Steel, No. 130.....50¢10¢
 Smith & Hemenway Co.'s.....25¢

Kettles—
 Brass, Spun, Plain.....80¢25¢
 Enamelled and Cast Iron—See Ware, Hollow.

Knives—
 Butcher, Kitchen, &c.—
 Foster Bros. Butcher, &c.....30¢
 Wilkinson Shear & Cutlery Co.....60¢

Corn—
 Wilkinson Shear & Cutlery Co.:
 Wilcut Brand Knives and Hooks 60¢
 Withington Acme.....doz. \$2.65;
 Dent, \$2.75; Adj. Serrated, \$2.20;
 Serrated, \$2.10; Yankee No. 1, \$1.50;
 Yankee No. 2, \$1.15.

Drawing—
 Standard List.....75¢45¢75¢10¢
 C. E. Jennings & Co. Nos. 45, 46, 60
 Jennings & Griffin, Nos. 41, 42.....75¢
 Swan's.....15¢
 Watrous.....15¢
 L. & J. J. White.....20¢45¢25¢

Hay and Straw—
 Serrated Edge, per doz. \$5.75¢6.00
 Iwan's Sickle Edge.....doz. \$9.50
 Iwan's Serrated.....doz. \$10.00

Mincing—
 Buffalo.....gro. \$13.00

Miscellaneous—
 Farriers'.....doz. \$3.00¢3.25
 Wostenholm's.....doz. \$3.00¢3.25

Knobs—
 Base, 2 1/2-inch, Birch, or Maple,
 Rubber Tip.....gro. \$1.25¢1.40
 Carriage, Jap., all sizes.....
 gro. 40¢45¢

Door, Mineral.....doz. 65¢70¢
Door, Por. Jap'd.....doz. 70¢75¢
Door, Por. Nickel.....doz. \$2.05¢2.15
 Bardeley's Wood Door, Shutters, &c. 15¢

Lacing, Leather—
 See Belting, Leather.

Ladders, Store, &c.—
 Allith Mfg. Co., Reliable.....50¢
 Lane's Store.....25¢
 Myers' Noiseless Store Ladders.....50¢
 Richards Mfg. Co.:
 Improved Noiseless, No. 112.....50¢
 Climax Shelf, No. 113.....50¢
 Trolley, No. 100.....50¢

Ladles, Melting—
 L. & G. Mfg. Co. (low list).....25¢
 P. S. & W.....40¢10¢
 Reading.....40¢

Lanterns—Tubular—
 Regular Tubular, No. 0.....doz. \$4.25¢4.50
 Lift Tubular, No. 0.....doz. \$4.75¢5.00
 Hinge Tubular, No. 0.....doz. \$4.75¢5.00
 Other Styles.....40¢10¢45¢

Bull's Eye Police—
 No. 1, 2 1/4-inch.....\$2.75¢3.00
 No. 2, 3-inch.....\$3.00¢3.25

Lasts and Stands, Shoe—
 Stowell's Atlas, Malleable Iron.....50¢
 Stowell's Badger, Cast Iron.....50¢

Latches—Thumb—
 Roggin's Latches, with screw.....doz. 35¢40¢

Door—
 Allith Mfg. Co., Automatic, No. 400 1/2 doz. \$4.00
 Cronk & Carrier Mfg. Co., No. 101,
 Cronk & Carrier Mfg. Co., Latch,
 Haap and Staples.....50¢
 Richards' Bull Dog, Heavy, No. 125.....50¢45¢
 Richards' Trump, No. 127.....\$1.50
 Stowell's Steel.....50¢

Leaders, Cattle—
 Small.....doz. 50¢; large, 60¢
 Covert Mfg. Co.:
 Cotton, 45¢; Hemp, 45¢; Jute, 35¢;
 Sisal, 20¢.

Lifters, Transom—
 R. & E.....10¢

Lines—
 Wire Clothes, Nos. 18 19 20
 100 feet.....\$2.25 2.00 1.75
 75 feet.....\$1.75 1.50 1.10
 Anniston Waterproof Clothes 50 ft.,
 3/8 gro. \$25.00; Gilt Edge \$25.00; A.
 Line, \$23.00; Acme, \$18.00; Alabama,
 \$17.00; Empire, \$16.00; Advance,
 \$14.00; Eclipse, \$13.50; Chicago,
 \$11.50; Standard, \$10.50; Columbia,
 \$9.50; Allston, \$13.50; Calhoun, \$12.00.

Samsom Cordage Works:
 Solid Braided Chalk, Nos. 0 to 3, 40¢
 Solid Braided Mason's.....30¢
 Silver Lake Braided Chalk, No. 0,
 \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3,
 \$7.50.
 Mason's Lines, Shade Cord, &c.:
 White Cotton, No. 3 1/2, \$1.50; No. 4,
 \$2.00; No. 4 1/2, \$2.50; White Cotton, No. 3 1/2,
 \$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75;
 Linen, No. 3 1/2, \$2.50; No. 4, \$3.50;
 No. 4 1/2, \$4.50.
 Tent and Awning Lines: No. 5,
 White Cotton, \$7.50; Drab Cotton,
 \$8.50.
 Clothes Lines, White Cotton: 20 ft.,
 \$2.75; 30 ft., \$3.25; 40 ft., \$3.75; 50 ft.,
 \$4.00; 60 ft., \$4.25; 80 ft., \$4.75;
 100 ft., \$5.25.

Locks— Cabinet—
 Cabinet Locks.....33 1/2¢33 1/2¢47 1/2¢
Door Locks, Latches, &c
 NOTE—Net Prices are very often made on these goods.

Reading Hardware Co.....40¢
 R. & E. Mfg. Co.....10¢
Elevator—
 Stowell's.....50¢

Padlocks—
 Wrought Iron.....75¢10¢5¢80¢5¢
 Net prices are general.

R. & E. Mfg. Co. Wrought Steel and Brass
Sash, &c.—
 Ives' Patent:
 Bronze and Brass, 60%; Crescent,
 40¢20¢; Iron, 60%; Window Ventila-
 ting, 55%; Robinson Pat. Ventila-
 ting Sash Lock, 33 1/2¢; Wrought
 Bronze and Brass, 55%; Wrought
 Steel, 55%.

Pullman Patent Ventilating Lock, 35¢
 Reading.....40¢

Machines—Boring—
 Com. Up'r't, without Augers,
 \$2.00¢2.25
 Com. Ang'l'r, without Augers,
 \$2.25¢2.50

Swan's Improved.....40¢10¢
 Jennings, Nos. 1 and 1.....33 1/2¢
 Atliers' Pails.....5.75
 Snell's, Upright, \$2.65; Angular, \$2.90

Corking—
 Reisinger Invinible Hand Power.....
 1/2 doz. \$18.00

Fence—
 Williams' Fence Machines.....each, \$5.50

Hoisting—
 Moore's Anti-Friction Differential
 Pulley Block.....50¢
 Moore's Hand Hoist, with Lock
 Brake.....20¢
 Moore's Cyclone High Speed Chain
 Hoist.....25¢

Ice Cutting—
 Chandler's.....12 1/2¢

Washing
 Boss Washing Machine Co.: Per doz.
 Boss No. 1.....\$57.00
 Boss Rotary.....\$57.00
 Champion Rotary Banner No. 1.....\$57.00
 Standard Champion No. 1.....\$50.00
 Standard Perfection.....\$27.00
 Cincinnati Square Western.....\$33.00
 Uneda American, Round.....\$33.60

Mallets—
 Hickory.....45¢50¢
 Lignumvita.....45¢50¢
 Timmers' Hickory and Apple-
 wood.....doz. 45¢50¢

Mangers, Stable—
 Swett Iron Works.....50¢

Mashers, Vegetable—
 Western W. G. Co., Potato.....60¢10¢

Mats, Door—
 Elastic Steel (W. G. Co.), new list, 50¢
 Keystone Wire Matting Co.:
 Keystone.....50¢
 Ideal.....50¢

Mattocks—
 See Picks and Mattocks.

Milk Cans—See Cans, Milk.
Mills, Coffee, &c.—
 Enterprise Mfg. Co.....20¢25¢
 National list Jan. 1, 1902.....30¢
 Parker's Columbia & Victoria, 50¢10¢60¢
 Parker's Box and Side.....50¢10¢60¢
 Swiss Lane Bros. Co.....30¢

Motors Water—
 Divine's Red Devil.....30¢

Mowers, Lawn—
 NOTE—Net prices are generally quoted
 Cheapest.....all sizes, \$1.85¢2.50
 Cheap.....all sizes, \$2.00¢2.50
 Better Grade.....all sizes, \$2.50¢4.50
 12 14 16 18-in.

High Grade.....\$4.50 4.75 5.00 5.25
 Continental.....60¢5¢
 Great American.....70¢
 Great American Ball B'r's, new list, 70¢
 Quaker City.....70¢
 Pennsylvania.....60¢5¢
 Pennsylvania, Jr., Ball Bearing.....60¢
 Pennsylvania Gold.....60¢
 Pennsylvania Horse.....33¢45¢
 Pennsylvania Pony.....40¢5¢
 Granite State:

Style A, Low Wheel.....70¢10¢10¢
 Style B, Low Wheel.....70¢10¢
 Style C, High Wheel.....70¢10¢
 Style D, High Wheel.....70¢
 Philadelphia:

Styles M., S., O., K., T.....70¢10¢5¢
 Style A, all Steel.....60¢10¢5¢
 Style E, High Wheel.....70¢10¢5¢
 Drexel and Gold Coin, special list, 40¢

Nails—
 Wire Nails and Brads, Miscel-
 laneous.....85¢10¢85¢10¢5¢
 Cut and Wire. See Trade Report.
 Hungarian, Finishing, Upholster-
 ers' &c. See Tacks.

Horse—
 Nos. 6 7 8 9 10
 Anchor.....23 21 20 19 18.....40¢5¢
 Champlain.....28 26 25 24 23.....50¢
 Coleman.....13 12 11 11.....net
 New Haven.....23 21 20 19 18.....40¢5¢
 Livingston.....19 18 17 16 16.....10¢
 Western.....19 18 17 16 16.....8 1/4¢
 Jobbers' Special Brands.....per lb. 9¢10¢

Picture—
 Nos. 1 2 3 4 5 6 7 8 9 10
 Brass H'd's.....55 60 70 ..gro
 Por. Head.....1.10 1.10 1.10 ..gro

Nippers—
 See Pliers and Nippers.

Nuts—
 Cold Punched: Off list.
 Square, Blank or Tapped.....
 \$4.80¢4.90¢
 Hexagon, Blank or Tapped.....
 5.20¢5.30¢

Square, Blank, C. & T. 5.10¢5.20¢
 Hexagon, Blank, C. & T.....
 5.80¢5.90¢

Hot Pressed:
 Square, Blank.....5.00¢5.10¢
 Hexagon, Blank.....5.40¢5.50¢
 Square, Tapped.....4.90¢5.00¢
 Hexagon, Tapped.....5.30¢5.40¢

Oakum—
 Best.....lb. 6 1/2¢
 U. S. Navy.....lb. 6¢
 Navy.....lb. 5¢
 Plumbers' Spun Oakum.....9 1/2¢
 In carload lots 1/4 lb. off, f.o.b.
 New York.

Oil Tanks—See Tanks, Oil.
Oilers—
 Brass and Copper.....50¢10¢
 Tin or Steel.....65¢10¢5¢70¢
 Zinc.....65¢10¢5¢70¢

Chase or Paragon:
 Brass and Copper.....50¢10¢
 Tin or Steel.....65¢10¢
 Zinc.....65¢10¢
 Malleable, Hammers' Improved, Nos.
 11, 12 and 13, 20%; Old Pattern, Nos.
 1, 2, 3, 50%.

American Tube & Stamping Co.:
 Spring Bottom Cans.....100¢70¢10¢
 Railroad Oilers.....60¢60¢10¢

Openers—Can—Per doz.
 Sprague, Iron Handle.....30¢35¢
 Sprague, Wood Handle.....35¢40¢
 Sardinia Scissors.....\$1.75¢\$3.00
 Vim Tin Shear and Can Opener,
 1/2 doz., 75¢; per gro., \$7.50

Egg—
 Nickel Plate, 1/2 doz., \$2.00; Silver
 Plate, \$4.00.

Packing—
 Asbestos Packing, Wick and
 Rope.....17¢22¢

Rubber—
 (Fair quality goods.)
 Sheet, C. 1.....11¢12¢
 Sheet, C. O. 8.....11¢12¢
 Sheet, C. B. 8.....12¢13¢
 Sheet, Pure Gum.....10¢45¢
 Sheet, Red.....40¢50¢
 Jenkins' '96, 1/2 lb. 80¢.....25¢

Miscellaneous—
 American Packing.....lb. 7¢10¢
 Cotton Packing.....lb. 16¢25¢
 Italian Packing.....lb. 9¢12 1/2¢
 Jute.....lb. 4¢4 1/2¢
 Russia Packing.....lb. 8¢11¢

Pails, Creamery—
 R. M. Co., with gauges, 1/2 doz.,
 No. 1, \$6.25; No. 2, \$6.50.

Pails, Water, Well, &c.—
 See Buckets.

Pans—Dripping—
 Standard List.....65¢10¢

Fry—
 Common Lipped:
 Nos. 1 2 3 4 5
 Per doz. \$0.75 0.80 0.90 1.10 1.30

Refrigerator, Galva.—
 Inch.....12 1 1/2 16 19
 Per doz. \$1.75 2.25 2.80 3.15

Roasting and Baking—
 Regal, R. M. Co., 1/2 doz., Nos. 5,
 \$4.50; 10, \$5.25; 20, \$5.75; 30, \$6.25;
 Savory 1/2 doz. net, Nos. 200, \$9.00;
 400, \$15.00.

Simplex, 1/2 gro.:
 No. 40 50 60 1 1/4 150 100
 \$30.00 35.00 42.00 31.00 39.00 46.00

Paper—Building Paper
 Asbestos.....lb.
 Roll Board or Building Felt,
 6 to 30 lb., per 100 sq. ft. 3 1/2¢10¢5¢
 Roll Board or Building Felt,
 3-32 and 1/4 in., 45 to 60 lb.,
 per 100 sq. ft.6¢
 Mill Board, Sheet, 40 x 10 in.,
 1-32 to 1/2 in.34¢5¢

Per roll
 Roe's Sized Sheathing, 500 sq. ft.
 Light weight, 25 lbs. to roll.....
 40¢50¢
 Medium weight, 30 lbs. to roll.....
 50¢55¢
 Heavy weight, 40 lbs. to roll.....
 65¢70¢

Black Water Proof Sheathing,
 500 sq. ft., 1 ply, 65¢; 2 ply,
 85¢; 3 ply, \$1.10; 4 ply, \$1.25.
 Deafening Felt, 9, 6 and 4 1/2 sq.
 ft. to lb. ton.....\$50.00
 Red Rope Roofing, 250 sq. ft.
 per roll.....\$1.75

Tarred Paper—
 1 ply (roll 400 sq. ft.), ton.....
 \$31.00¢\$35.00
 2 ply, roll 108 sq. ft.57¢
 3 ply, roll 108 sq. ft.80¢
 Slater's Felt (roll 500 sq. ft.).....76¢

Sand and Emery—
 Flint Paper and Cloth, 50¢10¢10¢
 Garnet Paper and Cloth.....25¢
 Emery Paper and Cloth.....50¢10¢60¢

Parers—Apple—
 Advance.....1/2 doz. \$4.00
 Baldwin.....1/2 doz. \$4.00
 Bonanza Improved.....each \$6.50
 Daisy.....1/2 doz. \$4.00
 Dandy.....1/2 doz. \$7.50
 Eureka Improved.....each \$20.00
 Family Bay State.....1/2 doz. \$15.00
 Improved Bay State.....1/2 doz. \$36.00
 Little Star.....1/2 doz. \$5.00
 New Lightning.....1/2 doz. \$7.00
 Reading 72.....1/2 doz. \$3.25

Heating 75.....	doz.	\$6.25
Rocking Table.....	doz.	\$6.25
Turn Table.....	doz.	\$6.00
White Mountain.....	doz.	\$5.00

Potato—

Saratoga.....	doz.	\$7.00
White Mountain.....	doz.	\$6.00

Picks and Mattocks—

List, Feb. 23, 1899.....	75¢@75¢	5%
Cronk's Handled Garden Mattock.....	doz.	\$2.00
Stanley, No. 2, \$2.00; No. 3, \$2.40.		

Pinking Irons—

See Irons, Pinking.

Pins, Escutcheon—

Brass.....	50¢@10¢@60%
Iron, list Nov. 11, '85.....	60¢@60¢@10%

Pipe, Cast Iron Soil—

Carload lots.		
Standard, 2-6 in. 50¢@10¢@50¢@10¢		
Extra Heavy, 2-6 in.	65¢@10%	
Fittings.....	70¢@10¢@70¢@10¢	

Pipe, Merchant—

Consumers, Carloads.			
Steel.			
	Blk. Galv.	Blk. Galv.	Blk. Galv.
1/4 & 1/2 in. 60%	53%	64.5%	45.5%
3/4 in.	71%	57%	64.5%
1 in.	73%	61%	72.5%
1 1/4 to 6 in.	77%	67%	72.5%
7 to 12 in.	72%	57%	63%

Pipe, Vitrified Sewer—

Carload lots.		
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:		
First-class.....	85¢@86%	
Second-class.....	90%	

Pipe, Stove—

Per 100 joints.			
	C. L.	L. C. L.	
Edwards' Nested:			
5 in. Standard Blue.....	\$6.25	\$7.25	
7 in. Standard Blue.....	6.75	7.75	
7 in. Standard Blue.....	7.75	8.25	
5 in. Royal Blue.....	7.00	8.00	
6 in. Royal Blue.....	7.50	8.50	
7 in. Royal Blue.....	8.50	9.50	

Planes and Plane Irons—

Wood Planes—			
Bench, first qual.			
Bench, second qual.	35¢@35¢@10%		
Molding.....	30¢@30¢@10%		
Bailey's (Stanley R. & L. Co.) 35¢@2%			
Union.....	30¢@30¢@10%		
Plane Irons—			
Bailey's (Stanley R. & L. Co.) 35%			
Chapin's Iron Planes.....	25%		
Miscellaneous Planes (Stanley R. & L. Co.) 30¢@30¢@10%			
Union.....	30¢@30¢@10%		

Planters, Corn, Hand—

Kohler's Eclipse.....	doz.	\$8.00
-----------------------	------	--------

Plates—

Felco.....	doz.	\$2.00
Self-Sealing Pie Plates (R. M. Co.)	doz.	\$2.00

Pliers and Nippers—

Kohler's Eclipse.....	per doz.	\$8.00
Plates—		
<i>Fellow</i>	Id.	40¢@41¢
Self-Sealing Pie Plates (R. M. Co.).	per doz.	\$2.00.....50%

Plumbers and Levels—

Chapin-Stephens Co.:		
Plumbers and Levels.....	30¢@30¢@10¢	
Chapin's Imp. Brass Cor. 10¢@10¢@10%		
Pocket Levels.....	30¢@30¢@10¢	
Extension Sights.....	30¢@30¢@10¢	
Machinists' Levels.....	40¢@40¢@10%	

Pullers, Nail—

Cyclops.....	50%	
Miller's Falls, No. 3, 3/4 doz., \$12.00.		
Morrill's No. 1, Nail Puller, 3/4 doz., \$20.00.		
Pearson No. 1, Cyclone Spike Puller, each \$30.00.		

Pumps—

Enterprise Mfg. Co.....	20¢@25%	
-------------------------	---------	--

Pushes and Shears—

Morrill's No. 1, 3/4 doz., \$20.00.		
-------------------------------------	--	--

Pulleys, Single Wheel—

Inch.....	1/2	1 1/2	2	3
Avining or Tackle, doz.	\$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye, doz., 4 in., \$1.25; 5 in., \$1.55				

Poles, Animal—

Common Frame; Square or Round End, per doz., 1 1/2 and 2 in.		
--	--	--

Police Goods—

Manufacturers' Lists.....25¢@25¢@5%

Polish—Metal, Etc—

Glasbrite, No. 2, 5 lb can (powder), each, \$1.25; 10 lb can, \$2.00; No. 2, 10 lb can (cake), each, \$2.00; 10 lb can, \$2.00.		
Prestoline Liquid, No. 1 (1/2 pt.), 1/2 doz., \$5.00; No. 2 (1 qt.), 1/2 doz., \$5.00.		
Prestoline Paste.....	40%	
George William Hoffman:		
U. S. Metal Polish Paste, 3 oz. boxes, 1/2 doz. 50¢; 1/2 doz. \$4.50; 1 lb boxes, 1/2 doz. \$1.25; 1 lb boxes, 1/2 doz. \$2.25.		
U. S. Liquid, 8 oz. cans, 1/2 doz., \$1.25.		
Barkeepers' Friend Metal Polish, 1/2 doz., \$1.75.		

Stove—

Black Eagle Benzine Paste, 5 lb cans, 1/2 doz., \$1.00; 1 lb cans, 1/2 doz., \$1.00.		
Black Eagle, Liquid, 1/2 pt. cans, 1/2 doz., \$1.00.		
Black Jack Paste, 5 lb cans, 1/2 doz., \$1.00.		
Black Kid Paste, 5 lb cans, 1/2 doz., \$1.00.		
Ladd's Black Beauty Liquid, per 100 tins.....	\$6.75	
Joseph Dixon's, 1/2 gr. \$5.75.....	10%	
Dixon's Plumbago.....	1/2 lb 8¢	
Firestone.....	1/2 gr. \$2.50	
Gem.....	1/2 gr. \$1.50	
Japanese.....	1/2 gr. \$3.50	
Jet Black.....	1/2 gr. \$3.50	
Peerless Iron Enamel, 10 oz. cans, 1/2 doz., \$1.50.		

Wynn's Black Silk—

Paste, cans, 1/2 doz., 5 oz., \$0.75; 1 lb, \$1.00; 1 lb, \$1.75.		
Paste, 5 lb cans, 1/2 doz., \$0.70.		
Liquid, cans, 1/2 doz., 6 oz., \$0.75; 1/2 pt., \$1.00; 1 pt., \$1.75.		
Steel Range Enamel, 1/2 doz., 1/4 pt., \$1.00; 1/2 pt., \$1.25.		

Poppers, Corn—

1 qt., Square.....	gro.	\$3.00
1 qt., Round.....	gro.	\$9.00
1 1/2 qt., Square.....	gro.	\$10.00
2 qt., Square.....	gro.	\$12.00

Post Hole and Tree Augers and Diggers—

See also Diggers, Post Hole, &c.

Posts, Steel—

Steel Fence Post, each, 5 ft., 42¢; 6 ft., 46¢; 8 ft., 48¢.		
Steel Hitching Posts.....	each	\$1.30

Potato Parers—

See Parers, Potato.

Pots, Glue—

Enamelled.....	30¢@10%
Tinned.....	35¢@10%

Powder—

In Canisters:		
Duck, 1 lb.....	each	45¢
Fine Sporting, 1 lb.....	each	75¢
Rifle, 1/2 lb.....	each	15¢
Rifle, 1 lb.....	each	25¢

In Kegs:

12 1/2 lb. kegs.....	\$3.50	
25 lb. kegs.....	\$4.50	
King's Semi-Smokeless:		
Half Keg (12 1/2 lb bulk).....	\$5.50	
Quarter Keg (6 1/4 lb bulk).....	\$3.50	
Case 24 (1 lb cans bulk).....	\$8.50	
Half case (1 lb cans bulk).....	\$4.50	
King's Smokeless: Shot Gun, Rifle, Keg (25 lb bulk).....	\$12.00	
Half Keg (12 1/2 lb bulk).....	6.25	7.75
Quarter Keg (6 1/4 lb bulk).....	3.25	4.00
Case 24 (1 lb cans bulk).....	14.00	17.00
Half case 12 (1 lb c. bk.).....	7.25	8.75
Robin Hood Sm'less Shot Gun.....	50¢@20%	

Presses—

Enterprise Mfg. Co.....	20¢@25%	
-------------------------	---------	--

Seal Presses—

Morrill's No. 1, 3/4 doz., \$20.00.		
-------------------------------------	--	--

Pruning Hooks and Shears—

See Shears.

Pullers, Nail—

Cyclops.....	50%	
Miller's Falls, No. 3, 3/4 doz., \$12.00.		
Morrill's No. 1, Nail Puller, 3/4 doz., \$20.00.		
Pearson No. 1, Cyclone Spike Puller, each \$30.00.		

Pumps—

Enterprise Mfg. Co.....	20¢@25%	
-------------------------	---------	--

Pushes and Shears—

Morrill's No. 1, 3/4 doz., \$20.00.		
-------------------------------------	--	--

Pulleys, Single Wheel—

Inch.....	1/2	1 1/2	2	3
Avining or Tackle, doz.	\$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye, doz., 4 in., \$1.25; 5 in., \$1.55				

Poles, Animal—

Common Frame; Square or Round End, per doz., 1 1/2 and 2 in.		
--	--	--

Auger Mortise, no Face Plate.

per doz., 1 1/2 and 2 in.17¢@10¢

Box-All-Steel, Nos. 3 and 7, 2 in.

Grand Rapids All Steel Noisless.....	doz.	50%
Ideal.....	70¢@5%	
Niagara.....	1 1/2 in., 16¢; 2 in., 19¢	
No. 26, Troy.....	1 1/2 in., 14¢; 2 in., 16¢	
Star.....	1 1/2 in., 16¢; 2 in., 19¢	
Tackle Blocks—See Blocks.		

Pumps—

Cistern.....	60%	
Pitcher Spout.....	75¢@10¢@75¢@10¢	
Wood Pumps, Tubing, etc. 45¢@50%		
Barnes Dbl. Acting (low list).....	50%	
Barnes' Pitcher Spout.....	75¢@10¢@5%	
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....	\$16.00	
Daisy Spray Pump.....	doz.	\$6.50
Flint & Walling's Fast Mail Hand (low list).....	55%	
Flint & Walling's Fast Mail (low list).....	55¢@5%	
Flint & Walling's Tight Top Pitcher.....	80%	
National Specialty Mfg. Co. Measuring, Nos. 2, \$6.00; 3, \$5.50.....	30%	
Myers' Pumps (low list).....	50%	
Myers' Power Pumps.....	50%	
Myers' Spray Pumps.....	50%	

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	2	2 1/2	3	3 1/2	4
	\$2.20	2.50	2.75	3.00	3.20

Inch...	3	3 1/2	4	4 1/2	5
	\$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch...	2	2 1/2	3	3 1/2	4
	\$2.75	3.85	5.00	6.00	7.00

Punches—

Saddlers' or Drive, good.....

doz. 50¢@75¢

Spring, single tube, good quality.....

1.75¢@2.00

Revolving (4 tubes).....

doz. \$3.50@3.75

Bemis & Call Co.'s Cast St'l Drive 50%

Morrill's Nos. 1AA, 1A, 1B, 1C.....

\$15.00.....

Hercules, 1 die, each \$5.00.....

Niagara Hollow Punches.....

35¢@10%

Wm. Schollhorn Co.:

Belt and Ticket, Bernard, 33 1/4%.....

Paragon, 50%; Lodi.....

50%

Timmers' Hollow P., S. & W. Co. 33 1/4%.....

Timmers' Solid P., S. & W. Co. 40%.....

doz., \$1.44.....

50%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron.....

2 1/2¢@2 1/2¢

Sliding Door, Wrought Brass.....

1 1/2 in., lb., 36¢.....

30%

Allitt Mfg. Co.: Reliable Hanger.....

50%

Crown.....

50%

Double Braced Steel Rail, 3/4 ft. 2 1/2¢

O. N. T. Rail.....

2 1/2¢

Griffin's:

xxx, 1/2 100 ft., 1 x 3-16 in., \$3.00;

1 1/4 x 3-16 in., 3.50.

Hinged Hanger, 1/2 100 ft., 1 x 3-16 in., \$3.10; 1 1/4 x 3-16 in., \$3.83.

Lane's:

Hinged Hanger, 1/2 100 ft., 1 in., \$3.40;

1 1/4 in., \$3.90.

O. N. T., 1/2 100 ft., 1 in., \$3.00; 1 1/4 in., \$3.50; 1 1/2 in., \$4.00.

Standard, 1/2 100 ft., \$1.00.

Lawrence Bros.:

1/2 100 ft. No. 201, \$4.00; No. 202, \$4.00.

New York, 1 x 3-16 in., 1/2 100 ft. \$3.00.

McKinney's:

Hinged Hanger Rail, 1/2 ft., 1 1/2¢.....

50%

None Better.....

1/2 ft. 3 1/2¢

Standard.....

1/2 ft. 3 1/2¢

Myers' Stayon Track.....

60¢@10%

Richards' Mfg. Co.:

Common, 1 x 3-16 in., \$3.00; 1 1/4 x 3-16, \$3.25; 1 1/2 x 3-16, \$3.50.

Special Hinged Hanger Rail.....

60¢@10%

Gauge Trolley Track, 1/2 ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.

No. 50.....

60¢@10%

Nos. 61, \$3.00; 62, \$3.25; 63, \$3.50; 64, \$4.

Rules

Boxwood	60@60&10%
Ivory	35&10@35&10&5%
Chapin-Stephens Co.	60%
Boxwood	60%
Flexfold	27&10&10%
Ivory	35&10@35&10&5%
Miscellaneous	50@50&10&10%
Stephens' Combination	55&55&10%
Stationers	10@10&10%
Keuffel & Esser Co.	35&10%
Folding, Wood	33&10%
Lufkin's Steel	50&10%
Lufkin's Lumber	60%
Stanley R. & L. Co.	60%
Boxwood	60%
Ivory	60%
Miscellaneous	60%
Zig Zag, Pin Joint	43&10%
Upson Nut Co.	60@60&10%
Boxwood	35&10@35&10&5%
Ivory	60%

Sash Balances—

See Balance, Sash.

Sash Locks—

See Locks, Sash.

Sash Weights—

See Weights, Sash.

Sausage Stuffers or Fillers

See Stuffers or Fillers, Sausage.

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Saws—**

Atkins:	
Circular	50%
Band	50&10@60%
Cross Cuts	35&5%
Mulay, Mill and Drag	50%
One-Man Saw	40%
40", Hand, Compass, &c.	40%
Chapin-Stephens Co.	
Turning Saws and Frames	30@50&10%
Diamond Saw & Stamping Works	
Sterling Kitchen Saws	30&10&15%
Disston's:	
Circular, Solid and Inset Tooth	50%
Band, 2 to 14 in. wide	60%
Band, 1/4 to 1 1/2	60%
Crosscuts	45%
Narrow Crosscuts	50%
Mulay, Mill and Drag	50%
Framed Woodsaws	25%
Woodsaw Blades	25%
Woodsaw Rods	25%
Hand Saws, Nos. 12, 99, 9, 16, 100	25%
D8, 120, 76, 77, 8	25%
Hand Saws, Nos. 7, 107, 107 1/2, 3, 1	30%
0, 0, Combination	25%
Compass, Key Hole, &c.	25%
Butcher Saws and Blades	30%
C. E. Jennings & Co.'s:	
Back Saws	25%
Butcher Saws	25%
Compass and Key Hole Saws	35%
Framed Wood Saws	25%
Hand Saws	20&25%
Wood Saw Blades	35%
Millers Falls:	
Butcher Saws	15&10%
Star Saw Blades	15&10%
Massachusetts Saw Works:	
Victor Kitchen Saws	40&10&50%
Butcher Saws and Blades	35&40%
Peace & Richardson's Hand Saws	30%
Simonds:	
Circular Saws	50%
Crescent Ground Cross Cut Saws	35%
One-Man Cross Cuts	40&10%
Gang Mill, Mulay and Drag Saws	50%
Band Saws	50%
Back Saws	25&25&7 1/2%
Butcher Saws	25&25&7 1/2%
Hand Saws	25&25&7 1/2%
Hand Saws, Bay State Brand	40%
Compass, Key Hole, &c.	25&25&7 1/2%
Wood Saws	10&7 1/2%
Wheeler, Madden & Clemens Mfg. Co.'s Cross Cut Saws	50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A	25%
Disston's:	
Concave Blades	25%
Keystone Blades	35%
Hack Saw Frames	30%
Fitchburg File Works, The Best	30%
C. E. Jennings & Co.'s:	
Hack Saw Frames, Nos. 175, 180	40&7 1/2%

Hack Saws, Nos. 175, 180, complete

Goodell's Hack Saw Blades	40&10%
Griffin's Hack Saw Blades	35&5&10%
Griffin's Hack Saw Blades	35&5&10%
Star Hack Saws and Blades	15&10%
Sterling Hack Saw Blades	30&10&5%
Sterling Hack Saw Frames	30&10&5%
Sterling Power Hack Saw Machines	each, No. 1, \$25.00; No. 2, \$30.00; 10%
Victor Hack Saw Blades	25%
Victor Hack Saw Frames	40%

Scroll—

Barnes, No. 1, \$15	25%
Barnes' Scroll Saw Blades	40%
Barnes' Velped Power Scroll Saw	without boring attachment, \$13;
with boring attachment, \$20	20%
Lester, complete, \$10.00	15&10%
Rogers, complete, \$3.50 and \$4.00	15&10%

Scissors—

Family, Turnbull's	50@50&10%
Counter:	
Hatch, Platform, 1/2 os. to 4	lbs. dos. \$5.50
Two Platforms, 1/2 os. to 8	lbs. dos. \$16.00
Union Platform, Plain \$1.70@1.90	
Union Platform, Stpd. \$1.85@2.15	
Chatillon's:	
Eureka	25%
Favorite	40%
Crocker Trip Scales	50%

The Little Detective

Union or Family No. 2	50%
Portable Platform (reduced list)	50%
Wagon or Stock (reduced list)	25&35%
The Standard Portables	45%
The Standard R. R. and Wagon	50&10%

Scrapers—

Box, 1 Handle	doz. \$2.00@2.25
Box, 2 Handle	doz. \$2.50@2.60
Ship	Light, \$2.00; Heavy, \$1.50
Adjustable Box Scraper (S. R. & L. Co.)	\$6.00
Chapin-Stephens Co., Box	50&30&10&10%

Screws—Bench and Hand

Bench, Iron, doz., 1 in.	\$2.50@
2 1/2; 1 1/2, \$3.00@3.25; 1 1/4, \$3.50@3.75	
Bench Wood	\$5@25&5%
Hand, Wood	\$5@25&5%
R. Bliss Mfg. Co., Hand	20&5@20&10%
Chapin-Stephens Co., Hand	25%

Coach, Lag and Hand Rail—

Lag, Cone Point, list Oct. 1	75&15%
Coach, Gimlet Point, list Oct. 1, '99	75&10%
Hand Rail, list Jan. 1, '81	70&10@75%

Jack Screws—

Standard List	75%
Millers Falls	50&10&10%
P. S. & W.	50%
Sweet Iron Works	75@80%

Machine—

List Jan. 1, '98:	
Flat or Round Head, Iron	50@50&10%
Flat or Round Head, Brass	50@50&10%

Set and Cap—

Set (Iron)	75&10&7 1/2%
Set (Steel), net advance over	
Iron	25%
Sq. Hd. Cap	70&10&7 1/2%
Hex. Hd. Cap	70&10&7 1/2%
Rd. Hd. Cap	50&7 1/2%
Fillister Hd. Cap	60&7 1/2%

Wood—

List July 23, 1903:	
Flat Head, Iron	87 1/2&10%
Round Head, Iron	85&10%
Flat Head, Brass	82 1/2&10%
Round Head, Brass	80&10%
Flat Head, Bronze	77 1/2&10%
Round Head, Bronze	75&10%
Drive Screws	87 1/2&10%

Scroll Saws—

See Saws, Scroll.	
Scythes—	
Grass, No. 1, Plain	\$6.25@6.75
Clipper, Bronzed Webb	\$6.50@7.00
No. 3 Clipper, Pol'd Webb	\$6.75@7.25
No. 6 Clipper and Solid Steel	\$7.00@7.50
Bush, Weed and Bramble, No. 2	\$6.50@7.00
Grain, No. 1	\$8.25@8.75
Bronzed Webb, No. 1	\$8.50@9.00
Nos. 3 and 4 Clipper	\$8.75@9.25
Solid Steel, No. 6	\$9.25@9.75

Seeders, Raisin—

Enterprise	25@30%
Sets—	
Fray's Adj. Tool Handles, Nos. 1, \$12;	
2, \$18; 3, \$12; 4, \$9; 5, \$7	50%
C. E. Jennings & Co.'s Model Tool	30%
Holders	30%
Millers Falls Adj. Tool Handles, No. 1, \$12; No. 4, \$12; No. 5, \$18	15&10%

Garden Tool Sets—

Ft. Madison Three Plovs, Hoe, Rake and Shovel	\$9 doz sets \$20.00
---	----------------------

Sets, Nail—

Octagon	gro. \$3.50@3.75
Buck Bros.	2 1/2%
Cannon's Diamond Point	gro. \$12.40
Mayhew's	gro. \$9.00
Snell's Corrugated, Cup Pt.	gro. \$7.20
Snell's Knurled, Cup Pt.	gro. \$7.20
Victor Knurled Cup Pt.	gro. \$7.50

Rivet—

Regular list	75@75&10%
Saw—	
Atkin's:	
Adjustable	40%
Disston's Star, Monarch and Triumph	30%
Morrill's No. 1	\$15.00
Nos. 3 and 4, Cross Cut	\$20.00
No. 5, Mill	\$30.00
Nos. 10, 11, 25	\$15.00
No. 1 Old Style	\$10.00
Special	\$15.25
Giant Royal Cross Cut	\$9 doz. \$8.00
Royal, Hand	\$9 doz. \$4.50
Taintor Positive	\$9 doz. \$3.75

Shaving—

Fox Shaving Sets, No. 30	\$24.00
Smith & Hemenway Co.'s	80%

Sharpeners, Knife—

Chicago Wheel & Mfg. Co.	70%
Pike Mfg. Co.	
Past Cut Pocket Knife Hones	\$1.50
Mounted Kitchen Sand Stone	\$1.50
Natural Grit Carving Knife	\$3.00
Hones, # doz.	\$3.00
Quick Cut Emery Carving Knife Hones, # doz.	\$1.50
Quick Edge Pocket Knife Hones, # doz.	\$2.50

Skate—

Smith & Hemenway Co., Eureka	20%
------------------------------	-----

Shaves, Spoke—

Iron	doz. \$1.10@1.25
Wood	doz. \$1.75@2.25
Rail's (Stanley R. & L. Co.)	45%
Razor Edge (Stanley R. & L. Co.)	50%
Iron, 50% Wood	55%
Chapin-Stephens Co.	30&30&15&10%
Goodell's # doz.	\$9.00
Wood's #1 and #2	50%

Shears—

Cast Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Cheap	\$5.00 6.00 7.00 gro.

Straight Trimmers, &c.

Best quality Jap.	70@70&10%
Best quality, Nickel	60@60&10%
Fair quality, Jap.	80@80&5%
Fair quality, Nickel	75@75&10%

Tailors' Shears

Acme Cast Shears	40@40&5%
Heinrich's Tailors' Shears	40@40&5%
Wilkinson Shear & Cutlery Co.	10%
Sheep, 1900 list	30&10&5%
Grass	50&10%
Horse or Mule	50&10%

Timbers' Snips—

Steel Blades	20&5@20&10%
Steel Laid Blades	40&10@50%
Forged Handles, Steel Blades, Berlin	50%

Heinrich's Snips

Jennings & Griffin Mfg. Co.'s, 6 1/2 to 10 in.	50%
Niagara Snips	40%
P. S. & W. Forged Handles	20%

Pruning Shears—

Cronk's Hand Shears	33 1/2%
Cronk's Wood Handle Shears	33 1/2%
Disston's Combined Pruning Hook and Saw, # doz.	\$18.00
Disston's Pruning Hook only, # doz.	\$12.00
John T. Henry Mfg. Co.	
Pruning Shears, all grades	50%
P. S. & W. Co.	30%
Wilson Shear & Cutlery Co.	50&10%
Hedge, Wilcut Brand	60&10%
Lawn and Border, Wilcut Brand	60&10%

Sheaves—Sliding Door—

Stowell's Anti-Friction	50%
Reading	40%
R. & E. list	15%
Wrightsville Hatfield Pattern	80%

Sliding Shutter—

Reading list	40%
R. & E. list	10%

Shells—Shells, Empty—

Brass Shells, Empty:	
Climax, Club, Mival, 10 and 12	65&5%

Paper Shells, Empty:

Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge	25&5%
Blue Rival, New Climax, Challenge, Monarch, DeLancey, Repeater, Yellow Rival, 10, 12, 14, 16 and 20 gauge	20&5%
Climax, Union, League, New Rival, 10 and 12 gauge	25&5%
Climax, Union, League, New Rival, 14, 16 and 20 gauge	20&5%
Export Metal Lined and Pigeon, 12, 16 and 20 gauge	33&5%
Robin Hood, Low Brass	20&5%
Robin Hood, High Brass	30&5%
Indian, for Black Powder	25&5%

Shells, Loaded—

Loaded with Black Powder	40%
Loaded with Smokeless Powder, medium grade	40&5%
Loaded with Smokeless Powder, high grade	40&10&10%
Robin Hood Smokeless Powder:	
Export Metal Lined	50%
Comets, High Brass	50&10&5%
Indian Black Powder	40&5%

Shingles, Metal—Per Sq.

Edwards Mfg. Co.	
Tin Galvanized	
14 x 20	C. L. \$4.25 L. C. L. \$6.00
10 x 18	4.50 6.25
7 x 10	4.75 6.50
Wheeling Corrugating Co.	
Dixie, 7 x 10 in.	Painted, Galv. \$5.90
Dixie, 10 x 14 in.	5.10
Dixie, 14 x 20 in.	4.75 5.65

Shoes, Horse, Mule, &c.—

Drop, up to B	25-lb. bag, \$1.90
Drop, B and larger	2.15
Buck	2.15
Chilled	2.15
Dust	2.35

Shovels and Spades—

Association List, Nov. 15, 1902	40%
Snow Shovels	
Long Handle	\$2.75@3.00
Wood and Mail, D. Handle	\$3.25@3.50

Sieves and Sifters—

Hunter's Imitation	gro. \$9.50@10.00
Hunter's Genuine	per gro. \$12.00@12.50
Buffalo Metallic Blued, R. M. Co.	# gr. 14&16 16&18 18&20 \$13.20 \$13.50 \$14.40

Sieves, Seamless Metallic

Mesh	14 16 18 20
Iron Wire	\$1.05 1.05 1.10 1.20
Tinned Wire	\$1.15 1.15 1.20 1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch	
Mesh 18, Nested	doz. \$0.90@0.95
Mesh 20, Nested	doz. \$1.00@1.05
Mesh 24, Nested	doz. \$1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:	
12 x 12 to 22 x 36 in.	60%
24 x 40 to 24 x 50 in.	50%
24 x 60 to 24 x 120 in.	30%
Barnes' low list:	
Up to and including 20 x 36 in.	60%
20 x 40 to 24 x 50 in.	55%

NOTE—There is not entire uniformity in lists used by jobbers.**Skains, Wagon—**

Cast Iron	70@75&10%
Steel	40

